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AND

Diseases of Women and Children

EDITED BY

BROOKS H. WELLS, M. D.

Professor of Gynecology at the New York Polyclinic and Gynecological Surgeon to the New York Polyclinic Hospital; Consulting Gynecologist to Beth Israel Hospital, New York; Consulting Abdominal Surgeon to the Brattleboro Memorial Hospital, Brattleboro, Vermont; Associate Surgeon to the Woman's Hospital of the State of New York; Fellow of the American Gynecological Society, the New York Academy of Medicine, the New York Obstetrical Society; Member American Medical Association.

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ORIGINAL COMMUNICATIONS.

GOITRE IN THE MOTHER AND ITS MANIFESTATIONS IN THE OFFSPRING.*

IS GRAVES' DISEASE INHERITED OR TRANSMITTED?

BY

GEORGE SCHMAUCH, M. D.,

Chicago.

(With four illustrations.)

THE cases I present to-night are of twofold interest: First, the mother with an exophthalmic goitre of the classical type; secondly, her four children, three of which show gradually increasing pathological changes in their bony system.

Discussing Graves' disease and its influence on the descendants, one has to first come to an understanding of the disease. I am an adherent of the Moebius-Rehn theory of Graves' disease as a quantitative anomaly in the secretion of the thyroid gland and not as a chemicopathological change. While generally the pathology of an organ has been cleared up by our knowledge of its physiological action, the opposite holds true in the thyroid. For a long time the gland was regarded as a superfluous organ, but we came to recognize that it has important functions which we had not understood. The contrast between Graves' disease and myxedema led Moebius to advance his theory and to advise the use of his antithyroidin. Struma and Basedow's disease have taught us that the thyroid gland belongs to that group of glands which have an internal secretion. Such glands are the thyroid, the hypophysis, thymus, suprarenal glands and the ovaries. Their influence is great and their true functions, thus far obscure.

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*Read before the Chicago Gynecological Society, March 10, 1909.

Most of the knowledge gained about the interrelation between these glands is based on the rather rough experiments upon animals and the clinical results obtained by successful treatment. I do not deny the connection of some of these organs with the sympathetic and the vagus, and there is no doubt that electrical treatment of the sympathetic gives good results in Graves' disease, though it is not the sovereign remedy which the French school claims it to be. Nerves doubtless influence the secretion of glands, as for instance the submaxillary, but our knowledge of their functions except as mere conductive organs is so limited that they have to be omitted in the discussion of the disease. Inasmuch as these organs, when successfully transplanted, are ready to take up their internal secretion, we can safely omit all the nervous theories from our discussion (transplantation of ovaries, Halban) (thyroid: Christiani and Kummer, Rfaeffer, Kocher). The influence of those organs on the human body must be transmitted through the circulatory system.

There is no uniform histological picture that corresponds to Graves' disease. A fatally ending case of thyroid disease presents a picture different from that of a struma removed from a patient in a less advanced stage. We find all kinds of transitional stages between a cystic struma, a colloid struma and Graves' disease struma. Clinical experience, on the other hand, shows that the symptoms of Graves' disease may appear at any time in a common struma, but the so-called "formes frustes" of the French of exophthalmic goitre show that the presence of all the three well-known symptoms of this disease is not absolutely necessary in the clinical consideration of Graves' disease. The success of our therapeutics also points to a more analytic differentiation of this disease. In a very few cases of Graves' disease iodin helps, in most of them it is of detrimental effect, while in the common struma it generally proves beneficial. In one case we see a rapid improvement under Moebius' antithyroidin; in others, again, the simple thyroid extract proves satisfactory. Therefore, all these facts point to the more analytic differentiation of this metabolic disturbance, called Graves' disease. It is not always possible to distinguish between hyper- and hypothyroidism. It is much more sensible to divide the anomalies of the thyroid secretion in the above-named way than to consider all the various disturbances, to be due to toxic or antitoxic products, secreted by the gland. This same division certainly pertains to all the other glands with internal secretions.

While hyper- and hyposecretion appeal to our reason, we must say that dysthyroidism does not. It assumes an unknown product of glandular secretion, absolutely without any parallel in any other gland in the body, and has neither a chemical, nor a histological foundation in our present knowledge. Therefore it seems wiser to refrain from the assumption of such an unknown chemicopathological product. There are so many glands with internal secretion in the human body, whose products as will be shown later, counterbalance each other that a quantitative disturbance in the output of any one of these glands is sufficient to explain the unbalanced metabolic changes, without referring to a mystic toxic secretion.

As the latest researches confirm, it is not the thyroid gland alone that causes the symptom-complex of Graves' disease. Moreover, 79 per cent. of all the operated cases that came to post-mortem showed a persistency of the thymus (Capelle). Some authors (Hart) therefore regard the thymus as the primary cause of at least one of the cardinal symptoms, *e. g.*, the tachycardia and the main effect of the Moebius antithyroidin seems to be derived from adrenalin contained therein, as shown by Hoffmann (and in a form that can be absorbed by the stomach). We will have to discuss the co-relations between the various organs with internal secretion later on; for they seem to cooperate. So much to justify the statement that Graves' disease is a metabolic disease, similar to other metabolic disorders, *e. g.*, diabetes, etc. That great success may be obtained by applying a rational dietetic treatment everyone handling such disturbances will confirm (read Alt's paper). We need not be surprised to find this disease sixteen times or even forty-six times (as Buschen claims), as frequent in women as in men, for women are physiologically subjected to greater changes in their metabolism than men, on account of the various changes, *e. g.*, menstruation, pregnancy, birth, and nursing. The organ that creates and regulates these phases in the woman's body is said to be the ovary. That there is an established relation between the thyroid and the sexual organs is not yet widely known. There was a time when the sexual disturbances were regarded as the primary cause. Charcot and his students looked upon pregnancy as nature's cure for Graves' disease. Most women, however, suffering therewith abort or give birth to a premature child, and although some women feel much better after birth, a number of them die during labor (Kleinwaechter, Stowe, Kron). The disease itself, like any other disorder, must be aggravated during pregnancy, when the woman's organism is called upon to do the greater work for two organisms.

We notice swelling of the thyroid in puberty. There are also cases of an enlargement appearing regularly at every menstruation (Jenks, Olshausen). According to Jenks, coition also has an influence on the thyroid. He relates that the ancients regarded the swelling of the thyroid as a sign of lost viriginity and measured the neck to prove the chastity of a newly married woman. Jenks, a gynegologist of the late Chicago Medical College, is one of the few older writers who recognize the connection between menstruation and goitre. The thyroid gland sympathizes with the uterus, as he states. His excellent paper, written in 1881, shows a keen observation of facts which we are just going to discover again, namely, the disappearance of the goitre in young girls when menstruation sets in, also the occasional spontaneous cure by cessation of the menses. We also find quite frequently swelling in pregnancy and eclampsia, and pregnancy is by some authors regarded as a physiological factor in this disease. Male animals deprived of their thyroid gland lose their potency (Lanz); female animals abort (Gurew). The milk production diminishes to one-third, and disappears completely in a few months (Lanz). Matthieu saw Graves' disease set in after removal of the ovaries, and I believe that this occurrence is probably much more frequent after operation for the so-called cystic ovaries than reported. Menstrual changes, and we might further say development and activity of the female sexual organs, depend on ovulation. On the other hand, we find atrophy of the sexual glands and mammæ, falling out of the hair in advanced Graves' disease (Kleinwaechter, Foote, Wynne, and others). There is a great resemblance between the condition of a young woman with this disease to an older woman in the menopause. It is the same picture—hot flashes, that sensation of heat, palpitation, tremor of the hands, all of which are comprised under the name climacteric phenomena (Ausfallserscheinungen). Many of these symptoms are found, though less pronounced in some young women at every menstruation. I mention these facts only to show that there is a clinically established connection between these two organs, thyroid and ovaries.

The ovaries, besides their function of ovulation, by their internal secretion seem to affect the bony and connective-tissue development in animals. The pronounced influence of the thyroid gland on all connective tissue is much better known than that of the ovaries, for extirpation of the ovaries in the young animal is followed by disease of the bones, which become weak and bent (Lanz and others). In Graves' disease we find a complete degeneration of the striped muscle of the whole skeleton (Askanazy). Insufficiency or defect of the thyroid gland causes a doughy swelling of the skin known as myxedema, caused by a myxomatous degeneration of the connective tissue. In Graves' disease we notice falling out of the hair. In the menopause, artificial or natural, we meet all those symptoms (dreaded by our women patients) as growing of a beard, a masculine appearance of the face. It is still under discussion whether there is anything like climacteric phenomena after removal of both ovaries, while recent authors differentiate between uterine and ovarian climacteric phenomena (Pankow). We do not know how many times an accessory ovary takes up the function of the removed ovaries. A. Martin reports among sixty cases, thirteen times regular menstruation. It took many years before we became convinced of Darwin's theory of evolution; it will take many more years before we learn that the animal organism is not only able to adapt itself to external conditions, but also to changes in its internal relations (Spencer's definition of life). It is fully observed clinically, that when there is a loss of such organs, the disturbances become compensated sooner or later, no matter whether the loss occurs accidentally or is surgically induced, the results are the same—compensation.

In Graves' disease the mammæ become atrophic. Extirpation of the ovaries has the same effect (a fact used by some English surgeons in treatment of inoperable carcinoma of the breast). Acromegaly is a disease attacking women much more frequently than men. As shown lately by Patellani, it affects women in the full age of puberty, and the connection with the ovaries is plainly shown by the fact that nearly all reported cases were amenorrheic. Castration in early youth produces excessive growth, and the whole industry of caponizing rests on this fact.

Another disease, whose connection with pregnancy is evident, is osteomalacia. Fehling showed that double ovariotomy cures puerperal osteomalacia, consequently we have come to regard the whole process as caused by a hypersecretion of the ovary. The same effect accompanies cessation of menstruation (Loehlein), while the recurrence of menstruation brings on the old pains anew (Seeligmann). Still there are a number of cases reported in which the removal of the ovaries did not stop the disease (about one-fourth of all reports). It seems to be a disease which prevails in those countries where struma is found. Hoenneck reports nineteen strumas in thirty-three cases of osteomalacia. Latzko reported five cases of osteomalacia following Graves' disease.

Seeligmann reports three cases of Graves' disease cured and improved by ovariin.

This entire discussion might seem foreign to the subject of this paper; still I had to give a short review of the facts demonstrating the complex metabolic nature of Graves' disease in order to prove the close connection between the thyroid and the ovaries, and the similarity of their influence on the connective tissue.

It is hard to define what kind of connection exists between these two organs, ovary and thyroid, whether they are synergetic (as Gauin, Florian, Hoffmann claim) or antagonistic (as Goldstein, Barchura, Bucura hold). *The whole process of internal secretion is still mystifying. A clearer understanding of these highly organized glands and their secretions will do away with the hypothesis of trophic nerves.* There are many facts pointing to an antagonism, as, for instance, the enlargement of the thyroid during pregnancy and menstruation, but as stated before the ovary seems a more complex organ than the thyroid. One fact should forever be emphasized and that is this, that *a pathologic secretion of toxic elements from any of the organs with internal secretion (so far assumed by most authors) is not necessary for the production of disturbances, which can be easily explained by a plus or minus in the activity of the gland.*

At the beginning of my paper I mentioned the fact that Hoffmann discovered the presence of adrenalin in the Moebius antithyroidin. The latter is nothing but the serum of the sheep, a herbivorous animal, deprived of his thyroid but retaining the products of the antagonistic glands. Anomalies in the pigmentation, similar to that in Addison's disease, *e.g.*, looseness of the bowels, decrease in the muscle power found in Graves' disease, suggested to Hoffmann the idea of a relative insufficiency of the adrenal glands, besides the hyperthyroidism. We *might add to these facts all the so-called subjective signs of pregnancy*, further the pigmentation appearing during pregnancy, the pigmentation noticeable at puberty, arising with the beginning of the ovulation, also the abnormal condition of relaxation of the peripheral blood-vessels. In all these conditions we have a greater activity of the ovaries, a hypersecretion, which again leads to more or less insufficiency of the adrenal glands. One of the astonishing results, we observe in the treatment of exophthalmic goitre with the Moebius serum, is the stopping of the diarrhea. It precedes the increase of weight in these patients. *Another phenomenon that most impressed me in the three patients whom I treated successfully by this method is the arrest of the menstruation which did not set in again until an equilibrium in the secretion in the various glands was established.* The patients grew stronger, gained in weight, were able to walk again and to do their housework, but menstruation stopped during the treatment with the serum, which seemed to suppress the activity of the ovaries and to create a relative insufficiency of the organs. All these facts point toward an antagonism between adrenal glands, thyroid, and the ovary. Hoffmann was the first to prove this antagonism, and saw the proof of his conclusions in the somewhat successful treatment of one case of osteomalacia with this serum.

It is not within the scope of this paper to go into details in regard to the connection of these glands with the nerves, also their relations to kidney, liver, pancreas, and diabetes. These things do not directly pertain to our present discussion. I also refrain from discussing the hypertrophies of some of these organs found in autopsies after the removal of analogous glands (cf. Roessle) The antagonism existing between thyroid and suprarenal glands has lately been proven again by the experiments of Bossi. Removal of one suprarenal gland in sheep, pregnant or not, brings on osteomalacia. Injection of adrenalin cures osteomalacia, also rickets as reported by other Italian physicians using this treatment on the advice of Bossi. These results substantiate Hoffmann's findings in the blood of osteomalacia. According to him, when Ehrmann's test on the frog's eye is used, the serum of osteomalacic patients shows elements antagonistic to adrenalin; they produce contraction of the pupil in the same way as in Graves' disease, while the serum in myxedema proves the hyperactivity of the adrenal bodies in dilating the pupil.

We have no proof of an antagonism between thyroid and ovaries, they are probably rather synergetic. The swelling of the thyroid in pregnancy is not caused by an inactivity of the ovary as generally understood. Although ovulation stops, the internal secretion of the ovary through the corpus luteum is probably more active than in a condition of nonpregnancy. Every one of these three glands may, through the increased or decreased output of its specific secretion, bring on a disturbance in the physiological increase or decrease of the bony substance, and all these processes are connected with an increased or decreased elimination of phosphorus. We find in some cases of Graves' disease an enlarged excretion of phosphorus (Alt), extirpation of the testicles or ovaries diminishes the elimination of phosphorus. Feeding with ovariin tablets increases it (Curatulo and Tarulli), extracts of thyroids, fed to dogs increased the output of phosphates ten times (Ross and Buerger). Extirpation of the suprarenal glands had the same effect (Bossi). The retention of the organic phosphorus, according to these authors, brings on an accumulation of lime salts in the human body in the form of calcium and magnesium phosphates, and leads thus to a restitution of the normal solidity of the bones. *Ovaries and thyroid, on one hand, hold the balance with their antagonists, namely, the suprarenal bodies.* "Hypersecretion of one of them naturally will bring on a relative insufficiency of the antagonist. The secretive activity of the ovary rises and sinks with that of the thyroid," as Hoffmann puts it. So much for the explanation of the nature of Graves' disease. It will help us to understand the malnutrition in children born of a mother suffering therefrom.

Mrs. H., thirty-five years old, had four children; all, as I will state as a curiosity, were born in November except the last one. Her first child was born when she was twenty-six years old, the second when she was twenty-eight, the third when thirty, and the fourth when thirty-two. This boy, the object of this paper, was born on the tenth of September, 1906, about eight weeks before his time, the fifth of November.

No history of goitre in the family way back to the great-grandparents. The patient menstruated when fourteen years, a year and a half later than her younger sister; no signs of rickets except an irregularity of teeth. She learned to walk at ten months. Her labors were normal, but protracted. In the second half of her first pregnancy a swelling in the right side of her neck appeared, and this has since increased with each pregnancy. From the time she was pregnant with her second child a general weakness set in impeding her greatly in her housework. She used to vomit during the whole nine months of her gestations except in her last pregnancy. This also was the only time her bowels were regular. During the third childbirth she had some trouble from her goitre, had to sit up in a chair on account of suffocating spells. She nursed all of her children except the last one. I saw her about thirty-six hours after her last labor. This child was born in head presentation in about three hours with the assistance of a midwife. The patient was very cyanotic, had immense edema of the entire body, was gasping for air; in short, presenting all the symptoms of an acute cardiac insufficiency. Her whole body was covered with prickly heat and she was perspiring profusely; pulse 145. Unable to lie down, she had had no sleep. Her neck measured 40 cm., and her eyes were bulging out at that time in an alarming manner. Camphor and digitalis was administered, which relieved her somewhat. Three days after labor, I put her on Moebius antithyroidin, one-half teaspoonful twice every second day. This dose was later on reduced to 20 drops and increased again to 50 drops. It was the only medical treatment she received except a diet free from NaCl, consisting chiefly of vegetables, eggs, and buttermilk. She improved rapidly under this treatment. Altogether she took twenty-eight bottles, equal to 280 cm. I must say, I never have seen more severe symptoms of Graves' disease than in this case. There was an extreme tremor of the hands, she could not hold anything without dropping it, also tremor of the tongue, violent headaches, profuse diarrhea, her hair came out in large quantities. Greatly excited during the day, she became delirious as soon as she fell asleep. Besides she was not able to swallow any water without choking. This condition had set in about two months before labor and kept up until three months afterward. Eight days after labor she was able to walk around in her room. On the eleventh day she went to bed for the first time; the edema disappeared rapidly. On the twenty-sixth day she was able to call at my office, the diarrhea had stopped, her bowels moved only two or three times a day. Pulse varied between 120 and 140, headaches had disappeared, the eyes did not protrude as much. She improved steadily; while she did not weigh more than 114 pounds after labor, she gained ten pounds within three months, and weighs now 138 pounds, more than she ever weighed. Her goitre went down to 37 cm., but measures now again 41 cm. Nevertheless, she has no trouble in swallowing. This shows that the latter disturbance has not been brought on so much by pressure as probably by a softening of the cartilage of larynx and trachea. She still has a distinct exophthalmus, is nervous, and has that hasty way of talking and moving about noticed in women suffering from Graves' disease. Her pulse beat varies now between 90 and 110. Her menstruation resumed six months after labor and appears in regular intervals of four weeks, but only lasts three days instead of eight days as before. From October, 1907, she was amenorrheic for four months. She has not taken any medicine for her goitre since about twenty months. According to her own statement, she is stronger and feels better now than she ever felt in the last six years, is again able to do her own washing. However, her breasts are atrophic, her hair is very thin, the genitalia appear normal, there is no pronounced atrophy. Her undiluted blood serum applied to the frog's eye (Ehrmann test) brings on a contraction of the pupil within twenty-five minutes, a condition called by Hoffmann thyroidosis in opposition to the adrenalin reaction. The patient in question probably suffers from hyperthyroidism, but, as Hoffmann himself states, this reaction does not prove hyperthyroidism.

In regard to the child, I must say it was somewhat neglected. The mother's condition was so serious that none took much interest in this little boy. He hardly weighed four pounds, was nothing but skin and bones, but appeared otherwise normal. As the mother had no milk, he was fed cow s milk one part to four parts of water with a spoon, as he was unable to take the bottle. Although not much older than thirty-two weeks, he developed nicely on this food. Five weeks after labor his eyes started to bulge out and the head as a whole seemed to grow, especially the forehead. A few days later the temporal bones began to protrude, then one side of the occiput, then the other side, then the left frontal bone in the region of the protuberance

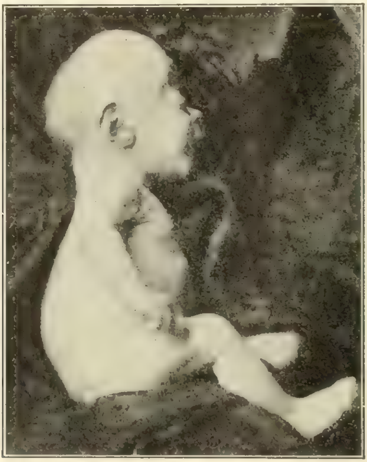

FIG. 1.—W. H. 5 months old. Forme fruste of myxedema. Note irregular shape of cranium, exophthalmus, myxedematous folds in skin of neck and chest, large abdomen, absence of hair except on the occiput.

seemed to elevate. The mother thought all these changes were brought on by the child sleeping on one side of his head. However soon afterward the right frontal bone protruded in the same way. While all this happened, the bones themselves did not soften, instead they seemed to grow harder, the sutures remained closed, the large fontanel became smaller. This whole process took about six weeks. The eyes were bulging out more and more, and at the same time small openings appeared in the temporal and frontal bones, the size of half a cm., surrounded by an elevated area. All these changes had no influence on his general condition, his appetite was good, he slept well and grew. At the end of the fourth month there was still a hole in the right frontal bone, and the child's head had the form of a turret head (Thurmschaedel) and saddle head. Forehead and occiput were bulging out, while the parietal bones were sunken. This, together with the exophthalmus, gave the

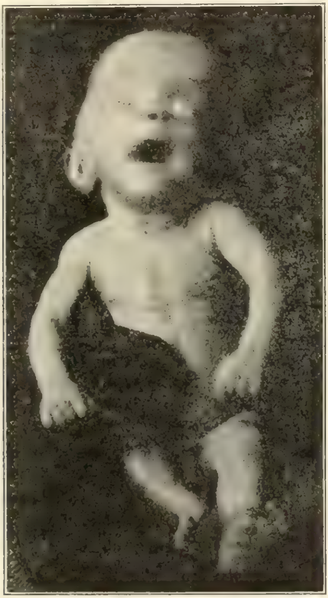

FIG. 2.—W. H. 5 months old. Note the open mouth, the umbilical hernia and the myxedematous folds of skin.

child a very queer appearance (cf. picture taken at that time). The treatment of the child consisted in the administration of lemon juice. He used about two lemons a day. Later on, phosphorus oil was given in addition. When eleven months old the boy weighed 19 1/2 pounds. He always enjoyed good general health. While the other children were suffering from whooping-cough, he did not contract it. When two years old, he suffered from pneumonia, but recovered. Last summer he developed an abscess in the right gluteal region near the anus.

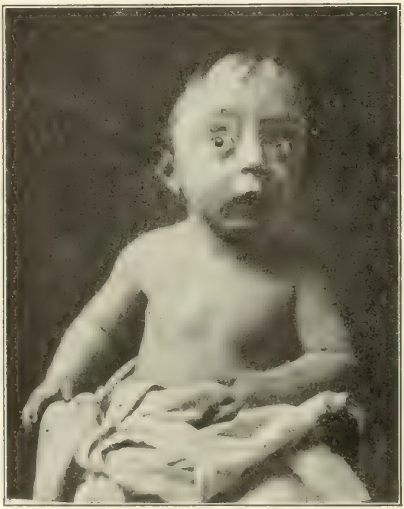

FIG. 3.—W. H. 27 months old. Turret and saddle head.

When opened, I was astonished to get into a perfectly calcified cavity. I thought of a dermoid and proposed extirpation. However, when I saw the child two months ago, the whole tumor had disappeared. This is another phenomenon pointing to the abnormal deposition and absorption of limy substance in the body of this boy.

He still appears abnormal. Comparing his present appearance with the photographs which were taken when he was four and one-half months old, it is evident that he has greatly improved. He looked worst when about twelve weeks old. His height is about normal, 80 cm., he weighs 35 pounds. His arms and chest are well developed, his skin has now a rosy natural color and shows a good panniculus adiposus. The muscular power in his arms is greater than one would think. He moves a chair without much difficulty as his mother reports. His legs are not so strong, he is just starting to walk. The umbilical hernia, to be seen in one of the pictures has disappeared, also the myxedematous condition of the skin, the wrinkles on his neck and under his arms; the genitalia are well developed. The part of the child which first attracts attention is his head.

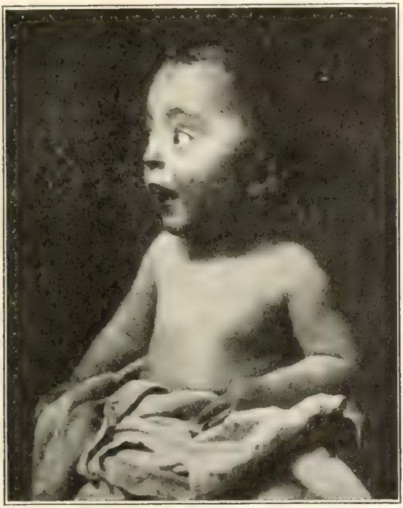

FIG 4.—W. H. Turret and saddle head.

The measurements are:

Circumference.—Frontaoccipital, February, 1907, 42 cm.; April, 1907, 45 cm. August, 1907, 47 cm.; February, 1909, 51 cm. Frontosuboccipital (highest part of forehead to neck), February, 1907, 41 cm.; April, 1907, 41 1/2 cm.; August, 1907, 43 cm. Mentooccipital, February, 1907, 43 1/2 cm.; April, 1907, 47 cm.; February, 1909, 53 cm.

Diameters.—February, 1909, Bitemporal, 14 cm.; biparietal, 12 cm.; frontomental (highest part of forehead), 19 cm.; suboccipitopregmatic 11.5.

The shape of the head has, therefore, not much changed; it reminds the obstetrician mostly of a child born in a protracted brow presentation. Still this boy was born with a perfectly round head. You notice an immense broad forehead the temporal bones bulging out, and a saddle-shaped depression of the parietal bones. His eyes are protruding, but not half as badly as about fifteen months ago. At that time you could not see more than the upper half of the cornea. He now covers his eyeballs completely when he sleeps. Another phenomenon you will observe is that the boy keeps his mouth open all the time, and the saliva runs continually from it. There is no saddle-nose, but as in congenital myxidiocy, the large tongue sticks out continually; the palate is very high-arched, V-shaped. During the first sixteen or eighteen months he was in the habit of shrieking aloud as myxedematous children do, terrifying his mother and the whole family. His eye-brows are not developed, there is hardly any hair on the temporal region; the rest of the head is covered with coarse red hair. Primary dentition began at the age of ten months; his teeth are only half developed and already show symptoms of decay. The enamel is covered with grooves and has a greenish appearance At the first glance at the eyes of the child, you will think of a hydrocephalus. But you can convince yourself how hard the cranial bones are. Contrary to hydrocephalus, the large fontanel was closed at the age of eight months. The sutures were never gaping, the aplasia of the cranium in this child was totally different from that found in hydrocephalus, the so-called "Lueckenschaedel." The craniotabes of rickets presents a different picture also. Rickets generally attacks the whole bony system and in the cranium the occiput is the place most frequently diseased, while in this boy the frontal and temporal bones showed defects. Besides the rarefaction, probably a premature synostosis of the parietal and sphenoidal bones took place, causing the saddle head, "Klinocephalus," according to Virchow. Syphilis may be excluded, as the child got well without any specific treatment. Clinically, the whole process in its rapid course impressed me as an osteomalacia rather than rickets. The histological difference between these two diseases has recently been denied by Schmorl, who regards the rachitis tarda as an osteomalacia. Nearly all bone diseases have one thing in common, and that is, their etiology is unknown. Syphilis and alcoholism, according to text-books, are the cause of everything. Lately, however, the opinion is more frequently expressed that every bone disease in childhood is caused by an anomaly of the thyroid (Fuchs) or analogous glands (Stoeltzner), or as we may say now of the antagonistic glands. There might have been a minor degree of hydrocephalus. The brain is that organ which is deprived of its limy substance second to the bones in rickets (H. Aron). However, the protrusion of the bulbi, the first symptom of an abnormality of this child, appeared before there were any striking changes in the rest of the cranium. In my opinion, it was not caused by the pressure of a hydrocephalus alone, but is probably the consequence of a softening of the orbital roof.

There are a small number of turret heads reported, but their etiology was so far unknown. They interest the ophthalmologist especially as sometimes an atrophy of the opticus sets in. In many of these reported cases an irregularly formed head was found, and as Velhagen states, the orbita in such patients is not a horizontal cave but round, and not so deep as normally. This causes exophthalmus. Another phenomenon, not yet described, in children like this boy, is a pronounced eosinophilic leukocytosis. His blood resembles that of a new-born with the exception of the increase in the eosinophiles.

Senator quotes Neusser as having reported the same findings in a case of osteomalacia.

When the mother first called my attention to the child it was because his eyes were bulging out in the same way as her own. There was only one opinion in his home and neighborhood and that was that the child had inherited this disease from his mother. I took this idea as a joke, I never had heard of a congenital Graves' disease (we might use this term as it appeared five weeks after labor). Still it is not so absurd. Graves' disease in children is very rare, and gives an infaust prognosis. To my knowledge there has not been a case reported which developed within the first three months of life. This little boy is good natured and you will agree with me that his eyes are bright and not those of a cretin or idiot. He talks a little and enjoys playing with his brothers. We might call his condition, according to French authors, a "forme fruste" of myxedema, combined or rather caused by osteomalacia or rickets, if you like this term better. This, however, is only a symptomatical diagnosis. What interests us obstetricians in this case is the etiology. *We have here one of the rare cases of a gradually increasing deterioration of the children of a mother afflicted with Graves' disease, increasing at the same pace as that of the mother.* The first child, a girl born while the mother acquired the disease, is apparently normal; the second, a boy, shows signs of rickets; the third, a boy, has an immense head for his age, which is five years, circumference 54 cm. Two years ago he looked very much like a cretin with his fat abdomen and large head. When one year old, he weighed 28 pounds, just as much as with two years, but could not walk. The fourth, the child described, nearly cost his mother her life. I do not think it necessary to emphasize that the mother's condition is accountable for that of her children. I purposely went into details of the complicated disarrangement of the glands with internal secretion, that are comprised in Graves' disease and their influence upon the connective-tissue system. *These children reflect the various stages of their mother's disease.*

Theilhaber, one of the few gynecologists who took up the question of pregnancy in Graves' disease comes to the conclusion that women afflicted therewith should not remain pregnant, abortion should be induced; secondly, girls with this disease should not marry; thirdly, they should not be allowed to nurse their children. In regard to the first question, I will say that in mild cases interference will be just as little indicated as in compensated valvular trouble. Pregnancy makes most cases of Graves' disease worse This fact always has to be considered. However, we have in the Moebius serum, in the different thyroid extracts, and in the ovariin means to compensate the systemic disturbance. In a more serious case, especially when there is already one child, I would not hesitate to interrupt pregnancy. This has to be done in the earlier months, as the insufficiency of the heart (Graves disease heart or struma heart) predominates in the picture. The heart of a woman with exophthalmic goitre is on account of the muscular changes often unable to do the increased work of pregnancy. Premature labor is just as useless as in heart disease. *An absolute indication for artificial abortion is the combination of Graves' disease with a persistent thymus* (status thymicus) in accordance with surgical rules. Induction of abortion will also be indicated in all those cases that show pressure symptoms on the trachea or esophagus. This will be found more frequently in cystic struma than in Graves' disease, where the vascular struma prevails. However, any form of struma might develop into an exophthalmic goitre. The woman, whose case is presented to-night, has a cystic and vascular struma. For months before and after labor she was unable to swallow any water Induction of abortion would certainly have been justified.

I always remember a sad case observed in Berlin at Olshausen's clinic. A woman with a large struma, cyanotic and in orthopnea, was brought to the hospital in her eighth month of pregnancy. Her serious condition was said to have developed quite suddenly. There was no time to induce labor we decided for Cesarean section and strumectomy. The latter was performed under local anesthesia, followed by tracheotomy and subsequent section under general anesthesia. The woman died within four days and the child within a week. Such cases show the value of an early induced abortion. It is difficult to make strict rules when and when not to interrupt pregnancy in Graves' disease as the cases differ so much. *However, I would not allow a woman with Graves' disease to become pregnant a second time.*

Should a woman suffering from Graves' disease marry? Can she expect to have healthy children? True, there are many women with this disease that give birth to children which are not only born healthy, but remain healthy and develop well.

But the case presented here would cause us to hesitate with our consent if we should be consulted.

Two years ago I delivered another woman with exophthalmic goitre who gave birth to a strong boy It was her fifth child, forceps after eighteen hours' labor. Her sister has the same disease. She had all the symptoms of an insufficiency of the kidneys, general edema, headache insomnia, etc., symptoms that are so frequently falsely called pre-eclamptic. Her boy is exceptionally bright brighter than any child I ever saw. The mother nursed him up to the age of three and one-half months, when her breasts dried up. After weaning, the child suffered from bowel trouble; in fact, it did not recover until the parents moved out into the country. The only sign of rickets in this child was he did not get his first teeth until he was fourteen months old. Genitalia well developed, no struma. When fifteen months old the boy suffered from priapismus, without apparent cause.

Schaffle reported recently a case of transmission of goitre through four generations. The two oldest children showed an enlargement of the thyroid, the six younger ones were normal. Goitre is generally recognized as an inheritable disease. Demme reported a case where all the children of a woman with goitre showed a struma until she was operated upon. The children which followed were normal. This certainly is a mere coincidence. Looking at our family, one might conclude that the youngest boy has inherited the disease, still it is merely an intrauterine acquired disorder. This question is quite important. As soon as we accept the theory that the boy has "inherited" his disease, we admit that he can transmit his functional disorder to his descendants. In order to decide this question, I must discuss briefly our present theories of heredity.

We the product of our parents, carry with us throughout life some inherited qualities; in other words, the physical arrangement of our various organs is an heirloom received from our ancestors. The average length of our life, the average life of the different organs, everything seems to be regulated by the laws of heredity. The paternal cell, the spermatozoon as well as the maternal cell, the ovum, are without sex (Weismann). They are identical in their validity, one may substitute itself for the other (Weismann). The nuclei of both contain the germinal protoplasm and carry in their chromatin all the inheritable substance. The product of the union of these protoplasms is the new individual which, therefore, will never be a perfect likeness of one of its parents. The child is the half-brother of its father and its mother, as Baumgarten puts it (along the lines of whose ideas the laws of heredity are discussed in this paper). Part of the germinal protoplasm is early withdrawn from general use (in building up the new individual) and is deposited in the sexual glands. This "deposited" germinal protoplasm is, therefore, not created in the sexual glands, it is there. It grows and increases from generation to generation, just as a long running root sends out sprouts that develop into new plants (Baumgarten). Father and child are derived from the same protoplasm, only at different times (v. Naegeli). We do not transmit our own product to our children, but an heirloom received from our ancestors. The consequence of this "continuity of the protoplasm" (Weismann) is that a disease cannot be inherited. A disease is always an active process and not a condition or quality (Martius). We do not inherit syphilis because the father is syphilitic; neither one of the germinal cells is syphilitic. As pointed out by Finger, before the discovery of the spirochæte, syphilis may be congenital, because the syphilitic virus is mechanically added to the fertilized ovum. In order to inherit a pathologic condition, the germinal cell, ovum, or spermatozoon, has to be afflicted in the same way, the "micellen" (v. Naegeli) of the germinal protoplasm must show the same anomaly. Upon this natural obstacle to inheriting acquired diseases rests the continuance of mankind. Adopting these laws, I have to conclude that this boy did not inherit his pathologic condition, he acquired it intrauterine. *While heredity is a physiological process (Haeckel), something we cannot escape, this child might never have been taken sick if his mother had been properly cared for.*

The fact that the last three children have rickets; furthermore, that all the children have outgrown their disease without special treatment, proves to me that the child's condition is the result of the mother's malnutritive media, but has not reached the child by way of the germinal protoplasm.

There is one exception to these laws: a noxious substance (not organized) circulating in the human system will not only prove detrimental to a certain organ, as for instance the kidney or thyroid, but might also attack the corresponding "micelle" of the germinal protoplasm, which is the anlage of that organ. A diminished resistance, a disposition toward the same illness is thereby created in this special organ (Orth). According to Orth and other pathologists, in this way an inheritable anomaly is created. This theory is not generally recognized, it is a return to Darwin's pangenesis and doctrine of "gemmulæ."

One of the reasons why I have reviewed these laws of heredity is that a family like the one presented is apt to throw some light on this subject. We do not deal with a disease caused by an organized poison, but with changes that are the consequence of a disturbed secretive function of an organ, or rather a series of them that include the sexual glands. Moreover, this organ, the thyroid, seems to be one of the most important ones in regard to the building up of the whole organism. Indeed, we might say with Baumgarten, we are not yet fully aware of the immense influence this organ exerts upon the whole connective-tissue system.

The connection of struma with drinking water is well known, while the causes of exophthalmic goitre are still under discussion. Only lately we learned that infectious disease such as la grippe, poliarthritis, etc., may produce an acute thyroiditis. The connection with pregnancy is also recognized. The only plausible theory given for Graves' disease, is that of Bayan who regards the changes in the thyroid as similar to those in Bright's disease. A noxious fluid, circulating in the body, brings on a lesion of the epithelium. The latter is thrown off into the lumen, but contrary to the kidney remains there, is not thrown off. The consequence is a much more lasting effect of the "noxious" substance. In accordance with this theory, *the enlargement of the thyroid in menstruation and pregnancy would be a similar process to the albuminuria and nephritis gravidarum.*

The possibility of transmission of a functional disorder, in the sense of Orth, cannot be denied; heredity by direct influence of the germinal protoplasm has to be admitted theoretically. Only observation of several generations in a family like ours would justify a positive decision one way or the other. Graves' disease is not an active process in the sense of Martius. A hypertrophic, and consequently hypersecretive gland, may as readily be inherited as a large head. Practical experience, however, contradicts this theory. Most of the children born of women afflicted with Graves' disease seem to be normal. At least there are only very few reports of serious rickets, as for instance in Theilhaber's first case. It was mentioned before that there is no proof to support the theory of a toxic secretion from a diseased gland, which could influence corresponding parts of the germinal protoplasm. In my opinion, *the rickets in the* *older children and the myxedematous condition in the youngest child are sequelæ of their being born of a mother suffering from secretive disturbance of the thyroid and the other glands.* There was no chance for the germinal protoplasm of the father to counterbalance any defects peculiar to that of the mother. The children were born normal as far as their external appearance shows. This, however, only proves the vitality of the germinal protoplasm—the parasitic nature of the child. In many cases of Graves' disease probably other glands will compensate by their increased or lessened activity, the metabolic disturbance brought on by the enlarged thyroid. Only a seriously disturbed harmony, as existed during the last gestation of this woman, seems to be able to influence the child in a pronounced manner. We know very little as to whether the glands with internal secretion are working during the period of intrauterine life. The thyroid does not become an organ without a duct before the middle of pregnancy. The sexual glands are not active. The thymus and adrenal bodies are comparatively large organs. So far no case of congenital rickets has been reported, that could not be successfully disputed (Stoeltzner). *The child adapts his own metabolism to that of the mother, and therefore is born apparently normal.* This takes place, so to say, in the same way, as the passive immunization by protective bodies of the maternal blood.

After birth, however, when the child is growing faster, when it has to adapt itself to the outside world, when it has to depend on the functoin of its own glands, every disturbance in the harmony of the glands with internal secretion will more readily become apparent. More so, when a child, such as this boy, is born before time. The test of the serum of this child on the frog's eye (February, 1909) gives a different result from that of the mother; there is not a contraction, but rather a slight dilatation, a rounding of the pupil taking place within ten minutes. However, not enough to prove the presence of adrenalin as found by Hoffmann in true myxedema.

Inasmuch, as the extrauterine developed malnutrition of this boy is a consequence of maternal disorders, an appropriate treatment of the mother with struma or Graves' disease during pregnancy is indicated. According to the insufficiency, determined by tests, when possible, on the frog's eye, we should administer antithyroidin, thyroid extract, or ovariin. As long as the effect of the organotherapeutics is still widely discussed, a dietetic treatment in our old way is perfectly justifiable. *Per-*

fect health during pregnancy is the only proof of an equilibrium of the glands with internal secretion. Such a therapy is not indicated in order to prevent the so-called toxemia. Toxemia means nowadays everything to the obstetrician, in the same way as Peruna cures everything. Thyroid extract may prove very beneficial in some cases of pregnancy, as lately shown by Foulcrod. *Administration of thyroid extracts after a certain pattern good for every kind of toxemia, is liable to cause great damage.* We should not only individualize, but also endeavor to find out which of the organs with internal secretion causes the malnutrition through its insufficiency.

As long as women with Graves' disease bear apparently healthy children, we have no right to prohibit marriage. This boy received thyroid extract for a little while, but without any striking result. I intend, however, to put him on fresh thyroid to see what effect it will have. If no result, he will receive Moebius antithyroidin.

One question only remains to be answered, namely, should a mother with this disease nurse her children? Theilhaber says, no. I do not agree with him. We know that the mother's milk does not always prevent the appearance of rickets; however, children nursed by their mother very rarely develop serious rickets. As stated above, the child's organism adjusts itself to the disturbed maternal metabolism (simulating an inherited disorder), and there is no reason why it should not thrive and grow, as long as it is kept under the same conditions it enjoyed *in utero.* The difficulty is that these women have no milk, but as soon as the child is able to select its own food it will pick out those elements it needs to build up its system. The boy presented to-night, did not show any real improvement until put on mixed food. Although he is not yet what you call a handsome child, he is improving and may become normal, and as I believe can beget healthy children. Hence Graves' disease is not an inheritable disease. It is occasionally transmitted to the children, as in the family presented, giving rise to temporary disturbances, such as rickets and myxedema. These conditions, however, are preventable by an appropriate treatment of the mother.

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100 STATE STREET.

THE INVOLUNTARY MUSCLE FIBERS OF THE PELVIC FLOOR.*

BY
WILLIAM E. STUDDIFORD M. D.,
New York.

(With four illustrations.)

Some time ago, at a meeting of the New York Obstetrical Society, the writer presented a series of dissections and microscopic sections of the pelvic floor, calling attention to the well-marked bands of involuntary muscle fibers that existed in the perineal body, and stating the belief that these bands were of great importance in maintaining the supporting power of the pelvic floor; that injury to them was the cause of many of the sequelæ of laceration of the perineum. Further clinical experience, together with studies of sections made on the cadaver and the microscopical examination of tissue removed at operation on the living subject, has strengthened this belief, and seems to warrant again calling attention to these muscle fibers and their apparent relations to the pelvic floor.

It is unnecessary to describe in detail the structures that go to make up the pelvic floor, but certain factors should be borne in mind. The levator ani muscle together with the strong fasciæ covering its internal and external surfaces are conceded to be the essential parts of the supporting structure, although there is some difference of opinion as to which is the more important element, the followers of Emmet placing the fasciæ first, while others attach greater value to the muscles. None of them satisfactorily explain the functions required of the pelvic floor, viz., a supporting power under ordinary conditions that will maintain the normal equilibrium of the abdominal contents and at the same time be capable of giving added support during pregnancy and be subject to dilatation during labor and involution after labor. Surely fascia alone will not respond to such requirements, and, as Browning pointed out years ago, it is unphysiological for voluntary muscle to be in constant contraction, as would be required if the levator alone were the supporting power. Dissections and microscopic examinations would seem to show that we have been in error as to certain features of the

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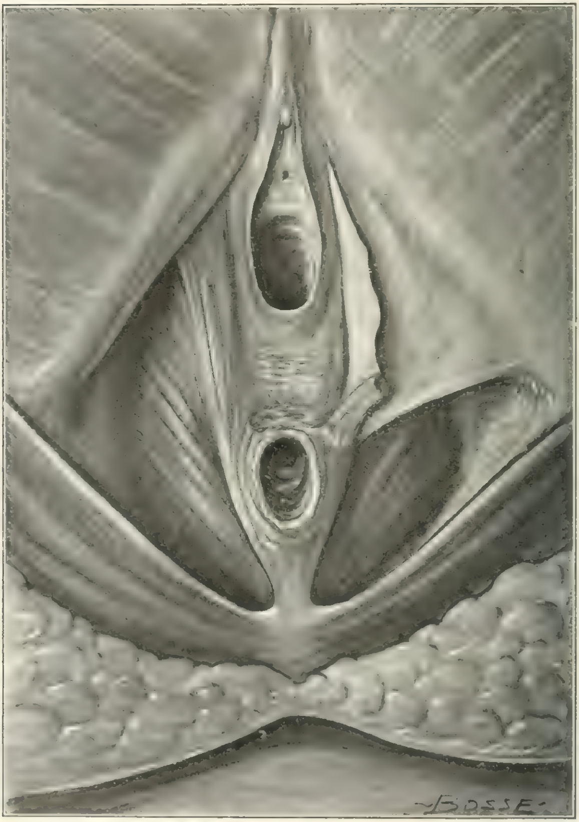

FIG. 1.—Showing the V-shaped direction of the levator ani muscles and their relation to the external sphincter. The triangular ligament and the external muscles intact on the left side Anterior end of sphincter cut and pushed over to the left side, exposing the involuntary muscle fibers in the perineal body.

pelvic floor. It is usual to describe the levator ani as a sling or horseshoe-shaped muscle. It would give a more correct idea of the structure were it described as V-shaped. The angle of the V being much wider posteriorly where the muscles are attached to the ischial spines and narrowing as the attachment to the pubic bone is approached where the anterior muscle bands of the levator are separated about 2 to 2 1/2 inches from each other and the sides of the V have a slight convexity toward the median line, the apex of the V being attached to the coccyx. The outer surface of the levator ani is in relation to the ischiorectal fossæ externally. These fossæ are filled with elastic fatty tissue that is subject to pressure by the glutei muscles and the strong muscles of the inner side of the upper thigh, such pressure giving added support to the levator and tending to maintain it in the best position for muscular action. The anterior fibers of the levator which arise from the posterior surface of the pubes are well developed and are the most powerful part of the muscle. They are in close relation to the lower end of the vagina and can be easily felt just inside the vulva on the lateral walls of the vagina. Their relation to the external sphincter is most important. In fact the relation of these muscles is so intimate that their separation by dissection is practically impossible and if considered together they form a firm muscular band extending from the pubes to the coccyx and embracing the lower end of the vagina and rectum. The general

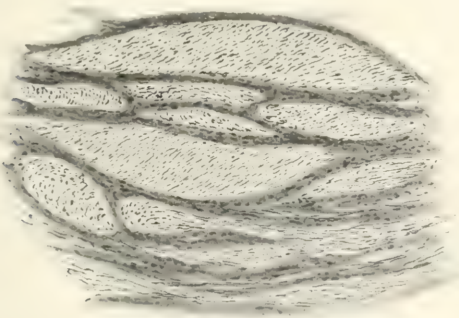

FIG. 2.—Section of perineal body from anteroposterior section in median line, showing the involuntary muscle fibers located anterior to and internal to the anterior end of the external sphincter.

direction of their fibers, so far as pelvic support is concerned, insures the muscles acting in a straight line from origin to insertion, at the same time the circular fibers of the sphincter close the rectum. On microscopic examination of the tissues lying between the halves of the levator ani and posterior to the anterior end of the external sphincter in the perineal body, a large amount of involuntary muscular tissue will be found. This muscular tissue is in close relation to both the levator and the sphincter, some of the bands being attached to the fascia covering the upper ends of the sphincter and running in a longitudinal direction, while other bands are connected with the fascia covering the levator on either side and run in a transverse direction. So far as I have been able to determine, no fibers from the levator ani muscles themselves pass between the vagina and rectum, as most anatomists state. It is my opinion that these involuntary fibers found in the perineal body are a most essential part of the pelvic floor. They are undoubtedly the muscle band that is felt in normal conditions just under and inside the hymen on the posterior wall of the vagina and are continuous with the levator ani muscles felt on the lateral wall. Their action must be essential in aiding pelvic support by the levator ani. They undoubtedly govern the contractions of this muscle, tending to draw the two halves toward the median line, thus placing them in a most advantageous position to withstand strain, and at the same time closing the vagina and drawing the anterior end of the sphincter forward so that it may aid the supporting power of the levator.

The presence of these involuntary fibers answers the criticism of Browning "that it is unphysiological for a muscle to furnish continuous support," for it seems reasonable to suppose that contract and relax according to the strain placed upon them as they do when located in other parts of the body. When laceration of the pelvic floor occurs, it is these involuntary fibers that are most frequently injured. The laceration occurs, as a rule, near their attachment to the levator on one side or the other, extending either in a straight line from before backward or in an L-shaped direction, which injures the involuntary fibers attached to the anterior end of the sphincter. The effect of such injury, if unrepaired, is to allow that half of the levator from which the fibers have been torn to sag outward and the sphincter to drop downward and backward, the half of the levator to which the fibers are still attached maintains a more nearly normal position, and on examination the continuous muscle band can be felt on the uninjured side, terminating sharply at the side of the laceration and forming a deep sulcus on the injured side. As a result of such injury the two halves of the levator ani no longer act in harmony, and are not drawn toward the median line when under strain, and the sphincter is not drawn forward to aid in giving support. The entire half of the levator on the injured side first begins to sag and later the uninjured side becomes affected, the ischiorectal fossæ become flattened, and we have eventually a typical case of rectocele and relaxed pelvic floor, and their accompanying symptoms. That these involuntary fibers are the cause of vaginismus seems probably proven by two cases in which microscopical examination of the thickened and sensitive hymen, removed in both cases, showed dense bands of involuntary muscle fibers between the two mucous surfaces. The nature of the muscular contraction in vaginismus corresponds more nearly to that of involuntary muscle than to voluntary muscle. The presence of these fibers undoubtedly explains the increase in growth and projection of the perineal body during pregnancy, the fibers evidently increasing in size, number, and strength to take care of the added strain placed upon them and also to provide for the necessary dilatation during labor. This fact it has not been possible to prove by actual dissection or microscopical examination, as suitable postpartum material has not been available, but it is certainly more reasonable to expect dilatation and later involution from involuntary muscles than from either fascia or voluntary fibers. Injury to these fibers from excessive or unusual strain would also explain the relaxed pelvic floor encountered in nullipara and virgins who have been compelled to do hard work or in those of sedentary or bad postural habit. In repairing injury to the pelvic floor the success of many of the methods of operation has undoubtedly been due to the uniting of the torn involuntary fibers to the levator ani from which they were detached and the restoration of the anterior end of the sphincter to its normal position. This is especially true of the Emmet operation, where the successful result is probably due to the restoration of these muscular bands and not of the fasciæ, as he describes.

For the past five or six years, on the service of Dr. H. C. Coe, at Bellevue Hospital, the repair of injuries to the pelvic floor has been based on this understanding of the anatomy of the perineum.

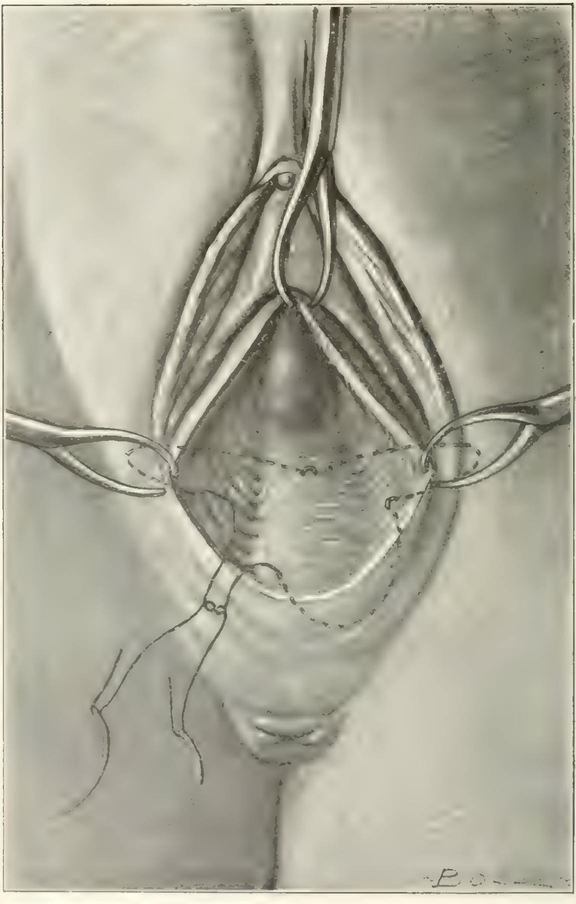

Fig. [illegible]. Denuded area in case in which there was a laceration into the right sulcus vaginæ Circular suture in place, showing its insertion into the levator ani on either side and through the anterior end of the sphincter, which is drawn toward the left side as a result of the laceration. The involuntary fibers have been torn from the right levator, but are still attached to the left.

The direction of the laceration is studied and an effort made to approximate the torn involuntary muscles to the levator ani from which they were detached and to draw the external sphincter forward into its original relation with the involuntary fibers and the levator ani. After many experiments a very simple procedure has been practised which seems to accomplish this object, and the after-results have been uniformly successful, not only in restoring the supporting power of the pelvic floor, but a number of cases have been carried through one or more labors afterward, and the dilatation of the perineum and subsequent involution has been most satisfactory. The edges of the laceration are grasped with bullet forceps at about the location of the lowest carunculæ on either side, as is done in the Emmet or Hegar operations; a third bullet forceps grasps the posterior wall of the vagina either at the upper end of the old scar in the sulcus of the vagina or, if this is not distinct or there is much rectocele, at the apex of the prolapsed posterior wall. Denudation of this triangular area is now made by removing the tissue at the base of the triangle, cutting close to the mucocutaneous border; then by blunt dissection the vaginal mucous membrane is removed very much in the same way the old flap-splitting operation was performed, except that care is exercised not to cut into the muscles, but to be certain so far as possible that all old scar tissue is removed. After the flap of mucous membrane is raised, a triangular piece is removed by cutting in a line from the external forceps toward the forceps holding the vaginal wall. In this denuded area the sulcus on the injured side becomes very marked and the involuntary muscle fibers attached to the uninjured side can be readily distinguished. As a rule, the edges of the upper angle of the denudation are brought together by three or four interrupted chromicized catgut sutures until the inner side of the muscular band is reached. A suture of plain catgut threaded at both ends with a full-curved round-pointed needle is then introduced in the median line in the rectovaginal septum, passing transversely just along the inner edge of the muscle band, being careful to see that the upper angle of the sulcus is included in the grasp of the suture. As the side of the vagina is reached the needle is plunged deeply into the anterior fibers of the levator emerging in the denuded area about three-eighths of an inch from the angle at the base marked by the bullet forceps on that side. The other end of the suture is then passed in the same way through the levator on the opposite side. The ends of the suture from either

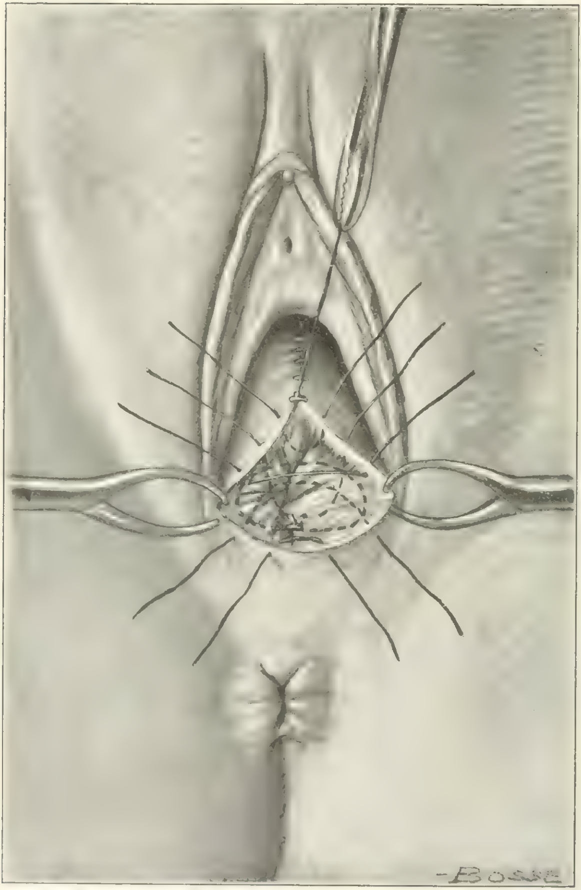

FIG. 4.—Dotted line shows the circular stitch tied; the levator muscles drawn toward the median line and the sphincter drawn upward in relation to them, and the involuntary fibers restored to their position on the right side. Other sutures needed to complete the operation in place ready to be tied.

ARY CLUB

side are now passed through the tissue forming the base of the triangular denudation toward the median line so that the suture passes through the anterior end of the sphincter, and the ends are then brought together and tied. The tightening of this suture brings the two halves of the levator toward the median line, draws the external sphincter upward, and restores the relation of these muscles to the involuntary muscular tissue lying between the halves of the levator. The sulcus on the injured side of the vagina disappears, and the denuded area is markedly narrowed. The edges of the mucous membrane are then brought together by interrupted chromicized sutures, the sutures introduced just inside the hymenal ring, being passed deeply into the tissue so as to augment the holding power of the buried suture. This same method of suturing is applicable to immediate repair of the pelvic floor in lacerations occurring after labor and in cases where there is complete laceration through the sphincter may be applied after the tear in the rectal wall and the ends of the sphincter have been brought together.

124 E. Thirty-sixth Street.

DRY HEAT AS A THERAPEUTIC FACTOR IN GYNECOLOGY.*

BY

GEORGE GELLHORN, M. D.,

Lecturer on Gynecology, Washington University; Gynecologist to the St. Louis Skin and Cancer Hospital and St. Luke's Hospital,
St. Louis, Mo.

(With three illustrations.)

Anyone glancing over the programs of gynecological societies must be impressed by the fact that the subjects of our discussions are almost exclusively of a surgical nature. It is an interesting observation that in America where the science of therapy in general is more developed than in other countries, gynecology has not pursued conservative modes of treatment with the same zeal with which it has treated, in the past, the surgical side of our specialty. Yet, the statement will hardly meet with any opposition that there exist certain pathological conditions of the female genitalia which cannot be treated at all by surgical means, and that there are others in which nonoperative methods yield equally good, if not better results than operative modes.

The necessity of dealing satisfactorily with such conditions has given rise to a number of new methods which have been termed, collectively, *Physical Therapeutics*. One of the more recent, and perhaps the most promising of these methods is the application of dry heat.

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*Read by invitation before the New York Obstetrical Society, April 13, 1909.

Heat has been a household remedy since time immemorial; and particularly in gynecology, hot poultices, douches, and sitz baths have always had a wide field of usefulness. But it was not until Bier published his ingenious investigations that a scientific explanation of the beneficial effect of heat was given. (Hyperæmie als Heilmittel, 5th Ed., 1907.)

According to Bier, every functionating organ is hyperemic during the period of its activity. Local hyperemia is present in the growth of an organ as well as in regeneration of tissues. In pathological conditions, too, irrespective of their origin, this hyperemia may be found, but never anemia, and we are thus forced to realize that this hyperemia represents the reaction of the organism against disease; in other words, the body utilizes hyperemia as one of its defensive means by which it endeavors to overthrow its enemies. If this be true, we must no longer treat the *symptoms* of any disease, *e.g.*, fever and inflammation, but we must, if possible, eradicate the *causes*. We must regard these symptoms as nature's own curative efforts, watch them, and influence them only when they have reached an excessive degree. The logical conclusion is this: that in the treatment of disease we can accomplish the best results by imitating the natural processes of cure.

As we have seen above, hyperemia is associated with every important act of life, whether physiological or pathological, and we thus arrive at the truth that hyperemia constitutes the strongest and most frequently employed reaction of the body in its spontaneous cure of disease.

We are familiar with two kinds of hyperemia—an active, or arterial, and a passive, or venous. For the purposes of this paper we are mainly concerned with active hyperemia which is characterized by an increase of the quantity of arterial blood in a given part of the body, and which, according to Bier, has the property of promoting absorption and reducing pain.

Of the various means of producing such an active hyperemia, heat is the best, and of the different methods of applying heat, the employment of hot air has given the most satisfactory results. Bier's success with this method in the treatment of many surgical affections, has, indeed, been unparalleled and has found an enthusiastic following, and the recent work by Willy Meyer and Victor Schmieden (Bier's Hyperemic Treatment, 1908) has introduced Bier's teachings to a wide circle of American readers.

To Polano (*Zentralbl. f. Gyn.*, 1901, No. 30) is due the credit of having introduced this principle of hot air into gynecological therapeutics, and an ever-increasing literature has amply proven the importance and usefulness of Bier's discovery for our special field.

Hot air is applied in two ways: 1, by means of hot-air boxes or chambers; 2, by the hot-air vaginal douche. I shall, however, leave the latter out of consideration, partly because I have had no personal experience with the same and partly because the experiences of others (Stein, *Journ. Am. Med. Assn.*, Jan. 23, 1909) do not speak in favor of it.

The hot-air boxes which were originally used by Bier are quadrangular wooden chambers of simple and inexpensive construction. Care must be observed to use wood which is well seasoned and free from resin as the latter would become liquid from the heat and might drip down upon the exposed parts. The boxes are supplied with a lid which shows two openings large enough for the reception of the abdomen and hips if the patient is placed in the apparatus. The hot air is carried into the box through a small funnel-shaped sheet-iron chimney which is curved at its upper end to meet a hole in the side of the chamber. An alcohol or gas lamp placed on a stand underneath the funnel, supplies the heat. Stein (*loc. cit.*) uses an ordinary semicircular cradle which is placed over the patient's pelvis and made air-tight by putting blankets over it.

A large number of modifications of the original apparatus has been devised, but it is, after all, immaterial which of these is used, provided a sufficiently high temperature can be obtained. Kehrer's model (*Zentralbl f. Gyn.*, 1901, No. 52) marks a distinct improvement. He employs a cradle which, on its inner surface, carries four electric-light bulbs. It has the advantage of looking more attractive than the usual hot-air boxes which bear an unpleasant resemblance to coffins; besides it is clean and protected from the danger of fire; it does not, however, give enough heat.

I have modified Kehrer's apparatus in order to extend its sphere of usefulness and, as my personal experience has been obtained with this apparatus only, I shall describe its construction a little more in detail.

My apparatus consists of two semicircular cradles made of thin sheet-iron and covered on the inside with asbestos. These two cradles lie one upon the other and may be pulled apart in the fashion of a telescope. On the inside of the free edges eight electric-light bulbs are attached and a long wire furnishes the connection with the nearest switch. A hole in the roof of the cradle is provided for the thermometer. The mercury bulb of the latter should be only about two or three inches above the abdomen so as to register the actual temperature of the immediate surroundings and not the temperature of the air in the upper portion of the chamber, which naturally is warmer than in the lower portion. If no thermometer is used this hole may serve as a chimney through which the hot moist air can escape. There are also a number of hooks from which gauze bags filled with calcium chloride may be suspended in order to absorb any moisture within the air chamber.

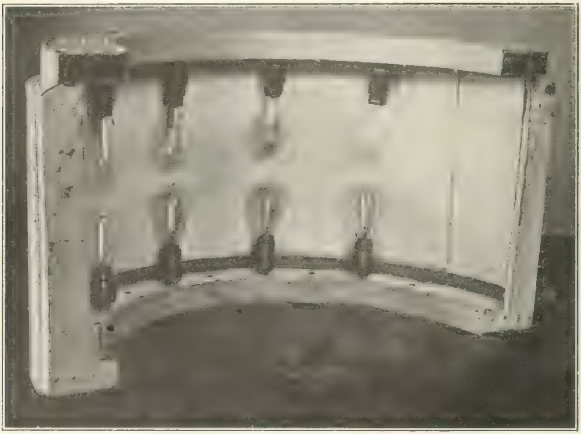

FIG. 1. The apparatus as seen from the inside. It is provided with eight sockets for the reception of either 16 c. p. or 32 c. p. bulbs according to the degree of heat desired.

The advantages of this apparatus are as follows:

1. It is of light weight and easily portable by chains upon the

outside; it can, therefore, be placed over the abdomen without the necessity of removing the patient from her bed.

2. It is clean.

3. There is no danger from fire. Care must, of course, be taken not to permit the calcium bags to touch the electric bulbs lest they explode.

4. As the heat can easily be regulated by eliminating one or more bulbs, burns of the skin can readily be avoided with the necessary attention.

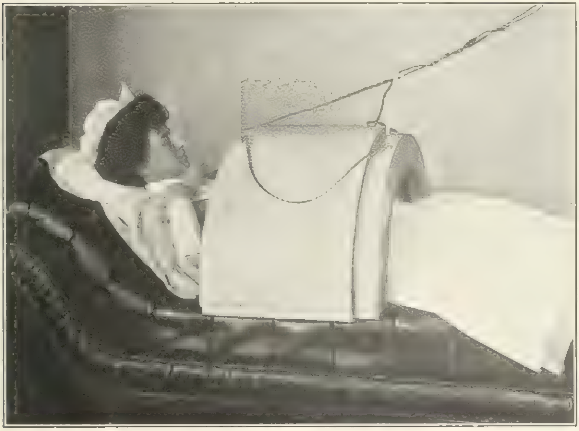

FIG. 2.—The apparatus is placed over the abdomen of the patient lying in bed or upon a couch. The patient must be undressed. For the sake of clearness, the blankets which are put over the apparatus in order to render the chamber air-tight, are left off in the picture

5. By substituting 32-candle-power bulbs for the ordinary 16-candle-power bulbs, any desired degree can be obtained.

6. By pulling the two cradles apart, a larger portion of the body or even the entire body can be heated according to the indication.

There are, as far as I can see, only two possible objections, viz.:

1. The price is slightly higher than that of the ordinary boxes, but the apparatus is very durable and because of its many advantages the difference in the expense would be compensated.

2. The necessity of electric light as a source of heat. This disadvantage should not disqualify the apparatus, as nowadays all hospitals and an ever-increasing number of residences are supplied with electric light.

The mode of application is exceedingly simple. The apparatus with the thermometer carefully adjusted is placed over the exposed abdomen and the electric light turned on. I prefer to increase the heat gradually and therefore I do not cover the apparatus with blankets until after a few moments' exposure.

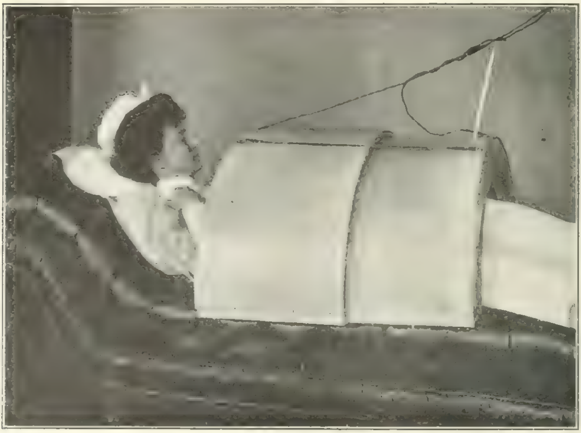

FIG. 3. The apparatus is pulled apart *ad maximum* thereby covering the greater part of the body.

The degree of heat obtained can be noted at any time and may be reduced or increased at will. While the temperature can be raised easily to 300 degrees, yet, from 200 to 220 degrees seems to me the best temperature, and this degree is reached with eight 16-candle-power bulbs within fifteen to twenty minutes. As the reaction of patients may vary in the individual case, they should not be left alone, and the pulse should be watched carefully. A cold cloth is placed on the forehead of the patient, and she is urged to drink large quantities of cool water.

The question naturally arises how these enormous temperatures can be borne by the human organism with impunity. We know from physiologic researches (Landois, Lehrb. d. Phys. des. Menchen, 1891, p. 426) that, if the surrounding temperature exceeds the temperature of the body, the latter becomes warmer and that this occurs more markedly and more rapidly the better the surrounding medium conducts the heat. Therefore, hot water appears to us of a higher temperature than air of the same degree. Experiments have shown that a full bath of eight minutes in water of 114° F. is dangerous to life. The hands may be immersed in water of 123° at most, and water of 140° causes intense burning in the integuments. On the other hand, a man may be left eight minutes in air heated to 260.6°, and Tillet, in 1763, found that girls could even stand an atmosphere of 269.6° for twenty minutes. The body temperature itself rose only to about 102°.

These observations are explained 1. by the fact that air is a poor conductor and consequently does not transmit heat as rapidly as water; 2. by the natural defenses of the body which are of the utmost importance in maintaining the proper balance. The surface of the body perspires freely in hot air. As was first observed by Benjamin Franklin (quoted from R. Tigerstedt, Text-book of Human Physiology, 1906), the sweat-glands are stimulated and the evaporation of the sweat thus excreted absorbs a large quantity of heat from the body.

Still more important is the action of the cutaneous vessels. The blood-vessels of the skin, like the other vessels of the body, are under the influence of the vasomotor mechanisms, and are constricted or dilated according to the momentary requirements of the heat regulation. Thus, in cold weather they are constricted, and in hot weather they are dilated. If, then, a given part of the body is exposed to intense heat, the cutaneous vessels of this part will be greatly dilated. The heart must work more vigorously and rapidly to supply these dilated vessels with blood, thereby bringing about an active hyperemia. At the same time these ever-renewed volumes of arterial blood serve as a cooling current and protect the exposed part from the effect of the excessive heat.

As the body always endeavors to maintain an equilibrium by proper compensation, one might infer that during this dilatation of the cutaneous vessels those of the abdominal viscera would be constricted, but Klapp (*Muench. med. Wochenschr.*, 1900, No. 23) has shown experimentally that this is not the case. He placed rabbits in his apparatus and exposed the abdomen to high temperatures. When he then performed laparotomy as rapidly as possible, he always found a marked hyperemia of the parietal and visceral peritoneum and the diaphragm. This proves that, by dry heat not only the superficial parts become hyperemic, but also the abdominal viscera. In this way the tissues are better nourished, their regenerative functions are stimulated to greater activity, and an increased local metabolism is established.

Heinsius (*Berliner Klinik*, Aug., 1904, No. 194) also calls attention to the fact that Bier's successes in the treatment of joint diseases prove the deep penetrating power of hyperemia due to hot air.

If we apply these physiologic considerations to the conditions obtained in a hot-air apparatus, it is evident that the evaporation of water on the surface of the abdomen tends to load the air with moisture, and as moist air is a better conductor of heat than dry air, we cannot apply very high temperatures unless we remove the moisture as quickly as possible. For this purpose Wilson (*Annals of Surgery*, 1899, p. 155) and Reitler (quoted from Bier, *loc. cit.*) introduced a receptacle for calcium chloride which, because of its intense hygroscopic qualities, absorbs the evaporated perspiration, thus restoring the superheated air to its original dryness. In my apparatus there are, as mentioned above, a number of hooks from which small gauze bags filled with calcium chloride are suspended. If these bags are too near the electric bulbs the saturated salt may explode. If we keep the air in our apparatus dry we may apply temperatures as high as 300°, but, as a rule, 200° to 225° is all that is needed, as will be seen later.

If we now employ the apparatus in the manner described, we make the following observations:

The patients, at first, feel quite comfortable. After about ten minutes, when the temperature reaches 180°, they frequently complain of an intense burning. It is imperative to be guided by the sensation of the patients and to discontinue the treatment for the time being. We will notice, however, that the sensitiveness decreases at each following application, so that after a few days the patient will bear the baking process for one-half hour and even longer. The temperature may thus be raised to 220°. I have never succeeded in subjecting my patients to a temperature of 300° F., which has been recommended by come of the German authors. For this reason I have not observed an acceleration of the pulse to 150 beats a minute, such as Duetzmann (*Monatsschr. f. Gyn.*, 1902, p. 71) has recorded. The patients perspire profusely over the entire body, particularly on the abdomen. The skin of the exposed parts becomes intensely red, either diffusely or in more circumscribed areas. In some cases, dark brown zones remain which are due to the pigment of destroyed blood corpuscles; these pigmentations disappear in time. Heinsius (*loc. cit.*) introduced into the vagina a tubular speculum of hard rubber which was held in place by the thighs of the patient, and he observed large quantities of secretion pouring from the cervix into the speculum. I could confirm this statement in a few cases.

The immediate effect of the treatment is a marked decrease of pain. This subjective improvement is so pronounced that it alone would justify the application of heat. While it is true that the pain will return after some time, yet its intensity decreases with each subsequent treatment. The appetite frequently improves very much and, not only during the treatment but afterward as well, larger quantities of water are taken. It may be due to this increased metabolism that many women gain in weight and lose their former constipation. On the other hand, I have found in several cases that the disfiguring accumulation of fat at the hips was reduced. Most of my patients experienced a pleasant sensation of relaxation and had a refreshing sleep, particularly when they were given a cool sponge bath immediately after treatment. In a fairly large number of cases there was but one, a woman of a highly neurotic temperament, who felt unduly excited and irritated; in this instance the hot-air treatment was discontinued after a few trials.

There are, on the whole, very few untoward symptoms associated with this treatment. Burns of a mild degree may occur, but should be avoided with proper precaution. I have observed small blisters in two cases only where there was a profuse perspiration which was not promptly wiped off on account of neglect on the part of the patient or nurse. Bürger (*Wiener klin. Wochenschr.*, 1903, No. 28) noted in weak and anemic patients at times excessive fatigue, palpitation of the heart, vertigo, and even nausea, but these symptoms must be ascribed to excessive degrees of heat—up to about 280° —used in these cases.

There is no hard and fast rule as to the length of each treatment and the degree of heat. It is preferable to apply the hot air about ten or fifteen minutes the first time until we see how the patient will react. Gradually the duration of the treatment is lengthened until she can comfortably bear the heat for about thirty or forty minutes, thereby a temperature of about 220° is obtained. *In no case should the temperature be raised when the patient complains of the heat.* Thin patients feel the heat more than stout ones. Application of dusting powders or ointments does not affect the sensitiveness. In these cases I cover the prominent iliac bones that are not sufficiently protected by adipose tissue and the upper portion of the thighs with loose gauze, leaving the abdomen bare, and thereby have succeeded in reducing any burning sensation. Constant attention should be given to the prompt removal of perspiration, either by means of calcium bags or by wiping off the sweat. After the treatment the patients should be permitted to cool off gradually by leaving them in the apparatus for one-half hour longer or by wrapping them in warm blankets. Wherever feasible they should receive a cool sponge bath, as mentioned above. A combination of the hot-air treatment with other conservative methods, such as vaginal douches, ichthyol-glycerin tampons, weighting, etc., will be found very useful. I shall speak of these later.

The more remote results of the hot-air therapy must be considered together with the indications for its application. These indications may conveniently be classed in three large groups, viz.:

1. Chronic exudative processes within the pelvis.
2. Certain menstrual disorders.
3. A number of postoperative conditions and complications.

The first and foremost indication for hot-air therapy is found in cases of chronic para- and perimetric exudates. These cases are the result of a mild infection in childbirth or miscarriage, or they are caused by an ascending gonorrhea, or else they may be the sequels of an operation. Since ligatures *en masse* are no longer practised in gynecological operations and nonabsorbable material is not used for sutures; since asepsis has been more perfected and care is taken to cover raw surfaces, these postoperative exudates around the stumps of the broad ligaments have become very much less frequent. But there are still many women who, though relieved of their former disease by an operation, now suffer from an affliction which, if it is not dangerous to life, condemns them to a chronic invalidism heretofore regarded as practically incurable.

This plastic infiltration of the pelvis may, in some instances, assume very large proportions. The entire pelvis may be filled out by a hard mass which often extends into the abdominal cavity. The sensitiveness on palpation is frequently very marked, and the symptoms from pressure upon the urinary tract and the rectum may be intense. In its early stages the exudate often shows a tendency toward suppuration, while in the more chronic forms the mass may, at times, become partially absorbed while its remnants are transformed into cicatricial tissue which, in its turn, will cause dislocations of the uterus and the other pelvic organs.

If in this latter class of cases absorption does not occur, we are practically helpless. Surgical interference is impossible as the exudative mass is not well defined and our ligatures would cut through. We have sent our wealthier patients to watering-places where various kinds of mud baths were given. In the majority of instances we have employed hot vaginal douches and ichthyol tampons, or we may have attempted bimanual or other kinds of massage. We may have succeeded in relieving our patients temporarily, but we have never *cured* a case entirely.

It is in these cases that the hot-air therapy fills a long-felt want. The results are excellent. All authors emphasize in their reports a rapid diminution of pain and a complete cessation of discomfort after four or five treatments. Symptoms due to pressure quickly subside. In a certain percentage of cases there is only a subjective improvement, while objectively on palpation no change in the size of the exudate can be found. But, in the overwhelming majority, the exudative mass is absorbed more or less quickly. The number of treatments varies in the individual case from eight to thirty-five.

Polano saw an old exudate of stony consistency, extending laterally to the right iliac bone and upward to the umbilicus, disappear completely after twenty treatments. In one of Bürger's cases, a tumor reaching as high as the umbilicus was reduced, by eighteen treatments, to a single cord of the size of the finger. Keilmann (*St. Petersburger med. Wochenschr.*, 1904, No. 28) reported more than fifty cases with outspoken objective improvement; there were several exudates of the size of a child's head which disappeared after two or three weeks' treatment without leaving any trace. Peham and Keitler (*Beitr. z. Geb. u. Gyn.*, 1903, p. 626) furnish statistics of 126 cases, of which seventy-four were cured both subjectively and objectively. Twenty of these became pregnant later. Fett (*Monatschr. f. Geb. u. Gyn.*, 1905, p. 674) subjected thirty-eight cases to this treatment, combined with other conservative methods, and found that in 25—65.8 per cent.—a perfect cure had been accomplished; 7—18.4 per cent.—were improved, while only in 6—15.8 per cent.—no change in the condition was noticeable. Of his patients twelve were treated three to four weeks, nine were treated one to two months, ten were treated two to three months, seven were treated three to four months.

The longest period, then, was 130 days. A decrease of the tumor was not observed by him prior to the second week. A premenstrual swelling of the tumor frequently took place, but again subsided.

Similarly good results were reported by Eltze (*Zentralbl. f. Gyn.*, 1907, p. 1602), Wagner (*Naturforscherversammlung*, Dresden, 1907), Jung (*Münch. med. Wochenschr.*, 1905, No 52), Stöckel (*Zentralbl. f. Gyn.*, 1905, No. 48), Lewicki (abstr. in *Zentralbl. f. Gyn.*, 1906, No. 7), Hörrmann (*Monatschr. f. Geb. u. Gyn.*, 1907), Hasenfeld (*Wiener klin. Wochenschr.*, 1907, No. 18), and others.

In many cases these pelvic exudates are associated with inflammatory conditions of the tubes and ovaries, yet an exact diagnosis is impossible because the hard mass filling the pelvic cavity does not permit of any differentiation. In these instances the hot-air treatment will prove also of great diagnostic value. A case in question is that of one of my patients who, twelve years previously, had acquired a gonorrhea *in puerperio*, with the formation of an exudate cementing the entire pelvis so that none of the genital organs could be distinguished by manual palpation. She had been treated for many years without receiving any permanent benefit. Eighteen hot-air treatments brought about an almost complete disappearance of the exudate, and now a hard and enlarged uterus and a double pyosalpinx could be clearly mapped out. It would now have been possible to remove these organs surgically, but, with the removal of the exudate, the pressure symptoms which had predominated in the clinical picture disappeared and thus no indication for any further interference remained. It should, however, be mentioned that persistent application of hot air may cure even a pyosalpinx, particularly in cases of not too protracted existence. Polano (*Zentrlbl. f., Gyn.* 1902, No. 37) succeeded in curing a bilateral gonorrheal pyosalpinx during the lying-in state, and Fett (*loc. cit.*) reported three cases of typical pyosalpinx cured by this treatment. Upon subsequent laparotomies performed on these patients for other indications (ventrofixation or ovariotomy) he found a perfectly normal condition of the tubes in the place of the former pus sacs.

While in the group of exudates just discussed, the infiltration shows a tendency toward absorption, there are cases in which the exudate tends to the formation of an abscess. The proper mode of treatment in these instances is incision and drainage. It is, however, undeniable that a complete restoration requires considerable time and that often hard cicatricial masses remain. If in such cases the hot-air treatment is applied, after free drainage of the pus has been established, a very rapid diminution of the abscess cavity will be observed. In two cases of this kind within the last year the dry-heat therapy removed every trace of the original affection in two and three weeks, respectively.

The surprisingly good results of hot-air therapy in parametric exudates naturally suggested the idea of employing the same treatment in chronic adhesive peritonitis within the pelvis, with dislocation and fixation of the uterus. While in many cases a subjective improvement may be achieved, yet I believe on the whole that in these cases a surgical treatment would yield better results.

In every case of pelvic exudate certain precautions must be observed. As long as fever exists the hot-air treatment is contraindicated, because the active hyperemia due to the heat would increase a tendency toward suppuration and might cause a spontaneous bursting of the abscess into neighboring organs, such as bladder and rectum, or even the peritoneal cavity. For the same reason the treatment should be discontinued at once, if fever occurs after one or two applications. *The postulate, then, is obvious that the hot-air treatment of exudates must always remain under the watchful control of the physician.*

Not only in pelvic exudates, but also in other pelvic or abdominal affections, fever should be a strict contraindication. Therefore, in all acute infectious processes, or in tuberculosis of the peritoneum the hot-air treatment is not available.

The second group of indications comprises certain menstrual disorders. Kehrer *(loc. cit.)* first suggested dry heat in infantilism of the female genitalia in order to overcome the arrest of development by an improvement of the blood supply. I have carried out these sugestions in two cases and noted both times a regular and gradually increasing menstrual flow during two or three periods. Unfortunately, however, I could not keep these two patients sufficiently long under observation.

Keilmann (*loc. cit.*) reports a successful treatment of amenorrhea, the cause of which was unknown. He applied dry heat in the case of a girl of sixteen whose menstruation, after having appeared regularly for some time, had completely ceased. Examination revealed normal conditions. After two treatments menstruation reoccurred.

Thomson (quoted from Heinsius, *loc cit.*) reported a prompt success in a case of lactation atrophy. Heinsius, in his excellent monograph, suggested that the good result in such cases was due to the fact that the hyperemia caused by heat stimulated the ovaries to an increase of their "internal secretion" and therefore produced an hypertrophy of the uterine mucosa. For the latter reason the hot-air treatment would obviously be contraindicated in cases of endometritis.

The beneficial effect of our therapy upon dysmenorrhea of virgins was observed by me in two instances. The treatment was given in the week preceding the flow and resulted in the total disappearance of the former pain.

Polano reduced an edema of the labia in the tenth month of gestation by means of hot-air treatment. Pregnancy was not disturbed. This fact is noteworthy, as several authors have spoken of dry heat as a means of interrupting pregnancy. Personally, I believe that dry heat cannot be used for this purpose, as I have tried it without success in a case of threatened eclampsia where the induction of premature labor was decided upon.

Finally, we possess in the application of dry heat a valuable adjuvant in the management of patients after operation. It may be used in shock after severe and prolonged laparotomies. In this condition it is necessary to increase the dangerously low body temperature as rapidly as possible, and the advantage of my apparatus, which, if pulled apart to its full length, heats the entire body, is evident without further comment.

Gelinsky (*Zentralbl. f. Chir.*, 1908, No. 1) recommended the hot-air treatment in intestinal paralysis following abdominal operations. He exposed his patient to the heat as early as the day of the operation and repeated the application once or twice daily. He noted that flatus were expelled regularly, and that the subjective condition of the patients was greatly improved. In thirteen aseptic laparotomies a single treatment was sufficient to produce peristalsis. Even in cases of infection of the peritoneal cavity the hot-air treatment was followed by an undisturbed convalescence. It is possible that the artificial hyperemia of the peritoneum increased the power of resistance of the organism.

As far as complications of wound-healing are concerned, Polano and Kehrer applied dry heat in cases of infiltration of the abdominal walls subsequent to laparotomies and observed very satisfactory results. I, myself, have employed this treatment in two cases of infiltration of the perineum, following perineorrhaphy. These cases were further complicated by the development of a rectal fistula, yet a complete *restoratio ad integrum* took place in ten and twelve days, respectively. In both these instances the dry heat was given twice daily after the patient had been in a hot sitz-bath for several hours. In connection with this it may be be said that dry heat should not be considered as a panacea, but should, wherever feasible, be combined with other approved methods.

The hot-air treatment is also useful in cases of recent postoperative adhesions. When, following an otherwise clean laparotomy, slight elevation of temperature occurs after the regular evacuation of the bowels, and in the absence of disturbed wound-healing or any other tangible cause, we must assume that adhesions are forming. In such cases I do not hesitate to apply the hot-air treatment after the sixth day *post operationem*, and have observed repeatedly that the temperature subsided, and that on later examinations no evidence of adhesions could be found. This was particularly evident in cases of ectopic pregnancy where numerous fresh adhesions had been severed during operation, and where, months later, no signs of any adhesive process were present.

The salutary effect of dry heat is at times quite evident in postoperative fistulæ, which so often resist all other modes of treatment. I have observed recently a very instructive instance of this kind. In a case of gangrenous appendicitis with diffuse peritonitis a necrotic hole in the cecum, of the size of a silver dime, was drained through the lower angle of the abdominal incision. There resulted a fecal fistula through which the greater part of the stools and all rectal enemata escaped. The usual treatment, including permanent water-baths, brought no relief until the hot-air treatment was applied. This, within two weeks, reduced the fistula to a hair-like duct, which now was cured by injections of bismuth paste.

In summing up, we must first remember that we have to deal, in gynecology, with a number of chronic conditions which cannot be relieved by surgical means. For the treatment of such conditions we have to resort to so-called conservative methods which, in many cases, have given highly satisfactory results, while in others they have signally failed. In point of efficacy, the rather recent method of dry heat has proved superior to the older modes of treatment. The employment of hot-air boxes or chambers is invaluable in the treatment of chronic exudates, irrespective of their location in the parametric tissues or in the pelvic peritoneum. The results obtained with hot air in this affection cannot be approached by any other method. The prompt objective improvement is intensified by an almost instantaneous relief from pain. The hot-air therapy has also been very promising in the treatment of certain menstrual disorders, notably, amenorrhea. It seems probable that at last we will be able to improve this heretofore intractable congenital condition. Furthermore, hot-air treatments have been found exceedingly useful in a number of conditions arising after operations, such as infiltration of the incision, postoperative fistulæ, paralysis of the intestines, etc. The number of indications has not been exhausted by this enumeration, and with growing experience, the sphere of usefulness for this new mode of treatment is likely to extend still further. As its application is quite simple, it is equally suited to hospital or private practice.

While the hot-air therapy has established for itself a recognized place abroad, particularly in Germany, but very few contributions on the subject have appeared in this country. It is obviously our duty as gynecologists not to overlook any valuable addition to our therapeutic treasury, and from this standpoint it is hoped that in future more general attention will be given to dry heat as a therapeutic factor in gynecology.

52 Lister Building.

LARGE POLYCYSTIC KIDNEY.*

WITH REPORT OF CASE.

BY

J. WESLEY BOVEE, M. D.,

Washington, D. C.

(With two illustrations.)

THE term "large cystic kidney" I have borrowed from the most excellent work, in two volumes, of Henry Morris on "Surgical Diseases of the Kidney and Ureter." Other writers have used the synonymous terms "cystic degeneration of the kidneys;" "cystic metamorphosis or transformation of the kidneys," "cystic disease of the kidney," "congeries of renal cysts," "conglomerate cysts of the kidney," etc., but I believe lesser objections exist to Morris' term of large polycystic kidney. Cystic degeneration of one or both kidneys may occur with the formation of but one or a few cysts in either of them. The same may be said of the term "cystic disease," of "conglomerate cysts" and of "congeries of cysts of the kidney." But the expression "large polycystic kidney" is particularly expressive, inasmuch as it refers to the size as well as the multiple character of the cysts. And yet in by no means all cases are the kidneys unduly large. It will be noted that the term does not affirm or oppose the opinion, nearly unanimous, that this disease is congenital or one of heredity. But of this I will speak in discussing the etiology and pathology of the condition, and I trust Dr. Neate, whom I have invited to follow me in the discussion of this subject, will give careful consideration to those view-points. A much emaciated woman, admitted to my wards in Columbia Hospital for Women, having two obscure lateral abdominal tumors, and markedly deficient urine elimination, died within two days. An autopsy revealed the nature of the tumors to be double large polycystic kidneys, and a paper I prepared for the 1908 meeting of the Southern Surgical and Gynecological Society was entitled "Bilateral polycystic degeneration of the kidneys" and based upon the study of that and reported cases. The history of the case was as follows: Mrs. H. B., age twenty-nine years, was admitted to my service in Columbia Hospital,

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* Read at the 462d meeting of the Washington Obstetrical and Gynecological Society, at Washington, D. C., March 5, 1909.

July 17, 1908, on account of a general anemic condition accompanied by a cough and agalactia. During the three days' residence in the hospital not more than four ounces of urine containing pus was obtained by catheterization. She exhibited twitching of the extremities, which rapidly developed into marked tremor, sank into uremic coma, and died on the 20th inst. Sixteen days previously she had given birth to a child and the labor was reported normal.

Dr. John S. Neate, assistant pathologist of the hospital and anatomist to the Army Medical Museum, has carefully studied the specimens from twelve cases, including my own, and his report on the autopsy in my case is as follows: The body showed only a moderate degree of emaciation, the skin somewhat jaundiced, and rigor mortis present. On opening the abdomen the peritoneum and intestines were found to be normal, but occupying each outer third of the cavity from the under surfaces of the liver and spleen superiorly down to or below the crests of the ilia were found enlarged cystic kidneys. The weight of the kidneys taken together was 80 ounces, length 8¼ inches, width 4¼ inches, thickness about 4 inches, both being symmetrically enlarged and about equal in size. The cysts varying in size from that of a pea to that of a walnut, were seen through the peritoneal covering filled in most cases with a straw-colored fluid and in others with dark brown or reddish coagula. The ureters were traced from the bladder to the pelvis and were normal in size. On section the left ureter oozed a few drops of pus. The bladder contained a few ounces of pale fluid containing pus threads, but there was no inflammation of the bladder wall and the ureteral orifices were normal. The kidneys exhibited no adhesions to the neighboring intestines and the blood-vessels appeared to be in their normal relations, but larger than usual. On section several ounces of fluid escaped, and the kidney was found to be a mass of closely packed cysts with thin fibrous septa and little or no normal kidney tissue visible. Some few of the cysts contained thick pus. The liver was pale, mottled with yellowish areas and rather bloodless (as indeed were all the organs) but contained no cysts. The spleen was slightly enlarged and firm. The contents of the thorax was normal except the heart which was slightly enlarged. The uterus and appendages were in good condition. Cultures made from the pus in the kidney gave capsulated diplococci and common pyogenic organisms.

Anatomical diagnosis: Bilateral congenital cystic disease of the kidneys with secondary infection. On removal to the laboratory, the organs were submitted to closer examination, and it was found that a large-sized probe could be passed with ease through the ureters into the pelvis. The plainly visible cysts were counted as they appeared on the convex surfaces of each half of the kidney and were found to average 250, while the cut surfaces gave 20 to 30 less in number. The infundibula were explored and several cysts were found, probably of recent origin, which opened therein, and distributed around these sinuses were the small irregular triangular areas not apparently occupied by cysts and containing the remnants of the kidney tissue proper. A liberal estimate of the solid tissue containing glomeruli and convoluted tubules in anything like normal arrangement taken altogether in one of these kidneys would not exceed one cubic inch of normal kidney cortex. While the larger cysts are about one inch in diameter and range downward from marble to pin-head and finally microscopic size, there is a certain uniformity in size and distribution which is suggestive. The smaller cysts occupy the triangular areas where the septa join and between these again microscopic cysts were subsequently found. This economy in distribution, taken together with the fact that the sound tissue is in immediate relation with the pelvis and that all semblance of pyramids is obliterated, leads one to the conclusion that the process of cyst formation, is gradual, continuous, and proceeds from the cortex inward, the area around the infundibula being the last to succumb. From the extreme thinness of the walls of the larger cysts one wonders that they have not coalesced to form a few large ones, and the inference is inevitable that the internal pressure must have been low or very equally counterbalanced by external pressure.

Dr. W. M. Gray, microscopist of the Army Medical Museum, made the microscopical sections and the photographs as well as the photomicrographs accompanying this report, which latter is as follows: The organs are made up of a soft spongy mass consisting of innumerable cysts varying in size from those of microscopic dimensions to those of the size of an English walnut. These cysts are filled with a semijelly-like albuminous fluid and urine; the walls of the cysts have a framework of rather dense fibrous connective tissue. The septa dividing the cysts one from another is composed of this dense fibrous tissue, with an occasional aggregation of small round cells. Running through the septa are numerous tubules and glomeruli; the majority of which are enormously dilated and there is every indication that the cysts have developed both from the tubules and the glomeruli. Many of the tubules and also the smaller cysts are lined by a very pronounced columnar epithelium which is quite distinct from the epithelium found in normal kidney tubules. The photomicrograph shows one of the dilated glomeruli and a small cyst, the latter partly filled by the jelly-like albuminous material. This cyst probably originated from a tubule. The photomicrograph also shows other smaller dilated tubules surrounded by dense connective tissue.

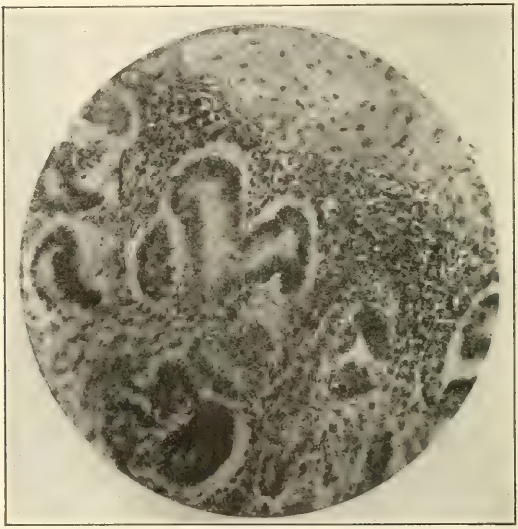
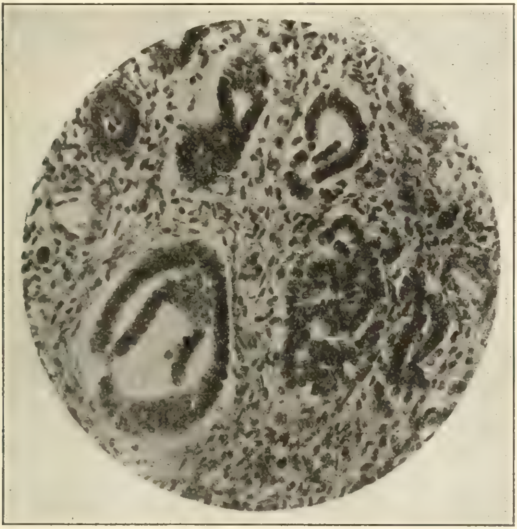


FIG. 1.—Photomicrograph showing influence of capsule on the development of the tubules and glomeruli in a fetal kidney.

Microscopical examination of these cysts and the intercystic tissue disposes one to classify them as primary and secondary; those which obviously have existed for some time and those of recent development. There is no sharp line of transition from one type to the other, but in view of the probable origin and effect of these cysts, it is helpful to an appreciation of the pathology and etiology of a condition all too obscure at the best. The oldest cysts have quite dense fibrous walls staining deeply with eosin, sometimes devoid of, or showing only vestiges of altered epithelial lining, and the adjacent tissue is rich in connective tissue, permeated by few tubules and these atrophied. The cysts of more recent formation contain cell detritus and fragmented nuclei and their walls contain little or no fibrous tissue. The neighboring tubules, chiefly of the collecting type, are flattened or pushed to one side in the process of their development, and the epithelium lining both cysts and tubules is of the low cubical order, practically identical in all of them. The intercystic tissue is relatively rich in tubules and contains but little connective tissue. The oldest cysts having dense fibrous walls are by no means the largest. In this kidney one is impressed by the persistence of straight tubules in the septa and



Photomicrograph showing the proliferation of cubical epithelium and partial occlusion of collecting tubules in the cystic kidney.

the epithelium of the low cubical type, very regularly arranged with large nuclei staining intensely with hematoxylin. This type of epithelium is found replacing that of the convoluted tubules and in Bowman's capsules. In the few convoluted tubules and tufts which have escaped obliteration the transition is beautifully shown. In some areas the characteristic epithelium of the convoluted tubules has been shed in masses into the lumina, and beneath it a new layer of the cubical type has formed. This type of cell, while it resembles somewhat those lining the ascending portion of the loops of Henle, is probably a reversion to the embryonic type. The few small islands of cyst-free tissue in the neighborhood of the calyces is rich in connective tissue and resembles the condition of chronic interstitial nephritis, except that there is a healthier appearance to the epithelium and an absence of change in the walls of the blood-vessels. The intercystic tissue is everywhere surprisingly vascular. Distended capillaries or sinuses exceeding six or seven times the normal size are found in close relation with tubules or penetrating islands of fibrous tissue, their walls consisting of a layer of flattened endothelial cells only and sometimes seven or eight of them aggregated so closely that their walls are in contact. Similar dilated spaces lined with endothelium, but containing no blood-cells, were observed and interpreted as dilated lymph channels. The reason for an increased blood-supply to such a mere shell of an organ, which consisted so largely of fibrous tissue, is hard to explain. The increase of connective tissue may account for the dilatation and contortion of the capillaries and lymph spaces described above and the increased blood pressure necessary to fill these sinuses and to preserve them from obliteration by the ever-encroaching fibrous tissue may, in part, explain the cardiac hypertrophy which accompanies this condition. A few small interstitial hemorrhages readily account for the color in the coagula found in some of the cysts and from these in a similar case Sollman, by chemical analysis, obtained the derivatives of hemoglobin, but no urea. The liver exhibited a moderate amount of fatty change, chiefly located in the peripheries of the lobules. The bile ducts appeared to be reduplicated and some of them were distended and, in general, were surrounded by more than the usual amount of connective tissue, but no cysts were found. Adding to the complexity of the histological picture are the evidences of the very recent bacterial infection which contributed to the fatal termination and are so well known as to require no description here.

The large polycystic kidney is a condition of that organ in which myriads of cysts varying in size from those having each a capacity of several ounces to those so small as to be visible only by the aid of a microscope. It very rarely exists in but one kidney, and is found in all ages, even the fetus not escaping its presence. Moreover, the cyst walls have a unique structure and the lack of disproportion in the dimensions of the enormously enlarged kidney is very striking. It is plainly different from the cystic kidney that results from a postnatal or even a congenital obstruction of a ureter or renal pelvis of one or both kidneys. Nor do I believe that chronic interstitial nephritis ever causes it, though admitting the possibility, which H. Morris positively denies. That it is a very rare condition may be inferred from the following facts. First, the number of cases reported in medical literature beginning with that of Jeffreys, in 1827, is probably less than 300, Bunting having collected 200 in the year 1900, and several having been published since that year. Second, that rarely has an observer seen more than one case, the one here reported being the only one I have seen. Morris, who has a world-wide reputation for knowledge and skill in renal diseases, reported eight cases. Dr. John S. Neate, as anatomist of the Army Medical Museum, in this city, has had the unusual opportunity of studying in that institution the specimens from twelve cases, the benefit of which he is now to give us.

Etiology.—Since this condition is found equally in the sexes and at all ages from intrauterine life to the advanced age of eighty-eight years, neither age nor sex can be said to be of etiological value. The study of the causes of this condition is necessarily divided into the following subheads, viz.: 1. that of heredity, 2. that of modification of structure either from congenital conditions, such as arrested development or inclusion, and, 3. such acquired conditions as interstitial nephritis.

I am disposed to accord to these three classes an importance in the order in which they are grouped. Heredity, therefore, I consider the most important element in the etiology of the large polycystic kidney. If one gives considerable thought and time to the study of the degeneration and the developmental hypoplasias, other than those resulting from conditions of influences brought to bear upon the fetus before birth or after birth from environment, and those acquired, *i.e.*, recognizes the differences between heredity, on the one hand, and congenital and acquired conditions, on the other, I believe he will recognize in heredity the source of this and many other vicious physical defects that are not so logically explained otherwise. The highly interesting paper of C. P. Noble, of Philadelphia, that appeared in the *Journal of the American Medical Association,* February 13, 1909, and entitled "Hereditary Hypoplasia in Man Due to Degeneracy," is worthy of careful perusal as it is a product of very advanced thought on this subject. Moreover, the contention that heredity is prominently concerned in the production of polycystic kidney is supported by the statements of Beck, Lund, Virchow, and Sanger. Beck found it in two sisters; Lund in a man whose mother was a victim of the same condition; Virchow found four out of six children in a family were subjects of it, and Sanger reported having seen families in which the first, fourth, seventh, tenth, and thirteenth children had polycystic kidneys. Whether the arithmetical ratio of three in Sanger's cases is of import I am not now prepared to state.

Again, the condition is double, as a rule; Dickinson studied twenty-six cases, finding but one kidney free from it. Lejars failed to find an unaffected kidney in sixty-two cases, and Ritchie found the disease was unilateral in but two of eighty-eight cases he studied by necropsy. It is also recorded that various deformities or abnormalities are common complications of the large polycystic kidney. Lejars found cysts of the liver in seventeen of the sixty-two cases he tabulated; Ritchie in twenty-one of the eighty-two cases in his table. Ritchie also found the uterus, the thyroid gland, and the ovary cystic, and cystic spleen has been noted as a complication. Henry Morris mentions the coexistence of talipes, cleft palate, imperforate anus, and absence of the anus, of the rectum, and of the urethra and external genitals. Morris also refers to absence of the ureter and bladder. Malformations of the aortic valves and of the interventricular septum were noted by Newman. The three facts that the condition is double, that it appears to be a family affection and that so many other evidences of interrupted development are commonly present would seem to again demonstrate Noble's theory of hypoplasia from degeneration. An exhaustive study of the few preceding and following generations in cases of polycystic kidney would no doubt result in the discovery of some very valuable evidence in support of the theory of hypoplasia resulting from degeneration or heredity, if you will, as the principal etiological factor in the large polycystic kidney.

I am not disposed to accord a very important etiological relation to developmental anomaly, either before or after birth, except as it depends upon heredity. One must admit, at once, however, that development of the kidney structure is interrupted. In the light of knowledge given us by late investigations of embryologists, the details of the developmental interruptions seem quite plain. One cannot ignore, or consider entirely disproven, the various theories that have been offered as to the origin of this condition. Of these there are four principal ones, viz.:

1. Persistent germinal rudiments—that is, fetal inclusions. 2. The obstruction theory which insists the development of the cysts is a sequel to a renal sclerosis that constricts the tubules or obliterates the papillæ. 3. That there is a colloid or fatty change and that the cysts are centers of the change. 4. The neoplasmic theory. Were the first theory sufficient to cover all cases the congenital influence would be at once unqualifiedly recognized; but with the proof of cirrhosis as a cause, great difficulty at once arises in accepting the inflammatory process as being always antenatal. In my judgment a very large proportion of the cases are due to the first-named theory. That the Wolffian body forms the ureter and calyces and the metanephric blastema the urine-forming part of the kidney is amply demonstrated by Kölliker and other embryologists. That a failure of fusion of these two structures occurs is readily acceptable in the light of developmental anomalies so frequently observed in other parts of the human body. Moreover, such anomalies are frequently coexisting with the bilateral polycystic kidney. One can also understand how the anomaly may rarely exist on one side only. I have already stated how rarely this occurs.

While I am not able to state positively that chronic interstitial nephritis does not have a causal relation to this condition, yet I am disposed to doubt it. I will leave to Dr. Neate the task of explaining to you the dissimilarity and yet the resemblance of the tissues in large polycystic kidney to those in chronic interstitial nephritis. It is quite likely that the late appearance in life of the large polycystic kidney gave rise to the idea that the condition arose from some renal lesion of late life. What condition would more readily be considered than a chronic inflammation, but actual evidence is wanting.

Pathological Anatomy.—The polycystic kidney seems to be one involved throughout nearly uniformly, the glomeruli often being entirely destroyed. In my case the kidneys weighed each 40 ounces and each measured 8 1/2 x 4 1/2 x 4 inches. Denforth reported a case in which the organs weighed 5 1/2 and 6 pounds, respectively, and Hare's recorded specimens were from a case in which one kidney was 15 1/4 inches in length and weighed 16 pounds, while the other was but double its normal size. And this case is typical of a commonly noted fact that the two kidneys are frequently found to have different sizes. The cysts occupying both the medullary and cortical substances alike project to the surfaces and push out the capsule as nodules. The cysts may be enormous and contain half a pint of fluid which may vary from a very thin watery fluid to a thick and grumous one or even nearly pure blood. As will be noted, the structure of the kidney is almost entirely transformed, there being left in my case an estimated cubic inch of renal functionating tissue in each one of the kidneys and it was in immediate relation to the pelvis. The kidney seems to be a mass of cysts separated by connective tissue. The oldest cysts have quite dense fibrous walls and show absence or only vestiges of a changed epithelial lining and the adjacent framework is largely connective tissue containing a few atrophied tubules. The newer cysts contain débris recognizable as broken-down cells, fragmented nuclei and walls containing but little or no fibrous tissue. The neighboring tubules, chiefly of the collecting type, are flattened or pushed to one side in the process of their development and the epithelium lining both the cysts and the adjacent tubules is of the low cubical order and practically identical. The intercystic tissue is relatively rich in tubules and contains but little connective tissue. The largest of the old cysts do not invariably have the thickest walls. The normal epithelium of the convoluted tubules and in Bowman's capsules is seen to be replaced by the low cuboidal epithelium mentioned. The few small islands of cyst-free tissue adjacent to the calices are rich in connective tissue resembling chronic interstitial nephritis, except the epithelium has an appearance nearer normal and absence of degenerative change in the blood-vessel walls. Marked vascularity of the kidney framework is everywhere apparent, and hypertrophy of the left heart is quite commonly observed as a complication. The distended capillaries or sinuses everywhere observable have a layer of flattened endothelial cells only, and sometimes seven or eight of these vessels are found in contact. Large spaces lined with endothelium but containing no blood-cells are here noted and are probably lymph spaces.

I shall not go further into the pathological anatomy, leaving it to the exceedingly careful study that Dr. Neate will interpret to us, and I trust he will explain at length the characteristics of the contents of the cysts.

Symptomatology.—As many of the cases were first noted as a cause of dystocia and others noted shortly after birth by the presence of large bilateral abdominal tumors, it is readily understood that symptoms of moment are frequently absent. The discovery of the tumors is commonly the first evidence of the existence of the condition and for some time the gradually increasing size of two bilateral tumors in the upper abdominal quadrants will be all the data available. In 10 per cent. of the cases no symptoms point to a renal lesion and the diagnosis is made after death. Rarely has uremia been the first evidence, and when such was the case coma and death promptly followed. The symptoms may sharply point to chronic nephritis, but dropsical effusions do not occur.

Crises simulating calculous colic occur and not always are such calculi quiescent. There is commonly localized pain and a feeling of fullness in the region of the kidney. The urine behaves much as in chronic nephritis and frequently contains blood. As mentioned earlier in this paper, the tumor may become remarkably large, Hare finding it weighing 16 pounds. Disorders of the nervous system as well as the gastrointestinal or the respiratory and circulatory system are not uncommon.

Diagnosis.—The diagnosis is very commonly not made before death. About 10 per cent. of the patients have no symptoms referable to the kidneys and in a larger per cent. of cases uremia was followed rapidly by coma and death. One-fourth of them presents a tumor of the kidney and fully one-half complains of symptoms of chronic nephritis. Lejars found in his series of 62 cases the diagnosis before death was made in but five. Morris says: "When with a sallow complexion, hypertrophy of the heart and increased arterial tension the urinary symptoms mentioned, and a tumor in each of the renal regions, or a tumor in one and an increased fullness in the other, are found, the diagnosis of 'large cystic kidney' is pretty clearly indicated." Osler believes hematuria with characteristics of the urine present resembling those of chronic interstitial nephritis together with the presence of bilateral tumors in the flanks and the cardiovascular changes present should justify the diagnosis of bilateral polycystic kidney. I am prepared to accept this statement, but in the few cases in which the disease is unilateral or in which on one side practically no tumor is present the diagnosis is by no means certain. Should developmental abnormalities exist in other portions of the body the presumption of polycystic kidney is greater, and if the patient be an infant the probability is greatly enhanced.

Prognosis.—The duration of bilateral polycystic kidney is markedly variable, inasmuch as it causes death in infancy and has been encountered as late in life as eighty-eight years. If these aged subjects have the disease at birth, then it is at once understood that the progress is by no means regular. Whether, like adrenal "rests" in the kidney, this degeneration may be dormant for many years and then develop rapidly is unsettled, but presumably such process does occur. It may lie dormant, apparently, during a natural lifetime, death occurring from some independent condition. Or, it may rapidly progress, cutting down the patient with but a few days or hours of severe illness as does chronic interstitial nephritis. In about half the deaths from this disease uremia, coma, or convulsions had preceded. Several died from pulmonary or cardiac complications. Cerebral hemorrhage is listed as a forerunner of the fatality and many have died after removal of one kidney.

Treatment.—Notwithstanding the deprecating reference made by Osler ("In these operating days," etc.) to modern surgery, neither he nor others have any nonsurgical treatment of value to suggest. While a few cases of polycystic kidney apparently have been cured by nephrectomy, Henry Morris, who has written a very fine treatise on "large polycystic kidney" in his excellent "Surgical Diseases of the Kidney and Ureter," says of the five cases he subjected to operation: "Unsatisfactory as these results are, yet two out of the five patients have had their lives prolonged and in complete comfort by nephrectomy, in one case for nearly seven years and in the other for three years. In the third case of unilateral disease the patient might have recovered and survived for years like the other two, had he not, so to speak, died an accidental death by suffocation while vomiting." About forty cases of nephrectomy for polycystic kidney with about twenty fatal results are to be found in literature.

It would seem that if surgery has naught to offer for the relief of this condition, we have but to remain quiet and allow death to claim its victims. It is also perfectly clear to my mind that in the bilateral character of the disease, and nearly always it is bilateral, surgery has little to offer. Beck proposed to incise the cysts, injecting into each small one a drop of saturated solution of iodoform in ether and excision of the large ones. I am not prepared to speak authoritively, but the difficulty of putting a drop of anything into each of the thousands of cysts in one such kidney or even puncturing each is at once apparent, nor could reliance be placed upon the efficiency of such a measure to prevent refilling of such cysts, as complete obliteration would seem a necessity.

It is quite evident that in those cases successfully subjected to operation and have lived comfortably for some years—perhaps are yet living—the fellow kidney was normal, for in several subjected to nephrectomy, prospects were bright for a few days, and then uremia supervened and continued until death shortly ensued. Of this character was Beck's case in which the fellow kidney was small but rapidly increased in size until death occurred on the eleventh day after operation; Haynes lost his patient two weeks after operation. And here again one is tempted to suggest the probable cause in these successful cases was an obstruction of local character and removable by operation. Certainly no case is recorded of continued improvement in health after any operation on one side when the disease coexisted, to an extent no matter how slight, on the other side.

Others have operated, removing a large polycystic kidney, and a rapidly supervening autopsy revealed the opposite kidney in a similar condition. In fact, in one of the ten cases studied by Neate (Kelley's), the right kidney weighing 21 1/2 ounces was removed before death and the left weighing 23 ounces by autopsy. The facts that the disease is nearly always bilateral and that it is uncommon to find the disease advanced equally on both sides are very important in considering the advisability of nephrectomy. Another important desideratum is that the presence of the tumor or of polycystic kidney is not the fountain of danger necessarily, but, instead, it is the crippling of the excretory work of the two kidneys. Unlike ordinary or malignant renal tumors that are originally unilateral and in which the fellow kidney is usually normal, we here have to deal with a kidney affection practically always double. It seems but logical, then, that our first thought in treatment should be conservation of renal functional structure. In my case Neate estimated that but one-fifteenth of the functionating structure of either kidney remained. It was plain therefore, as the patient died of deficiency of renal excretion that this reduction was too great to be consistent with life. It is then plain that more than two-fifteenths of the functional ability of one kidney must be retained. Just how much more has not been ascertained. But making due allowance for the tendency to rapid progress in the kidney remaining after nephrectomy, it would seem very hazardous to remove a kidney when the other one offers the slightest evidence of involvement.

To sum up, then, I would say that treatment is nonsurgical except in two conditions: 1. When the disease is unilateral or reasonably concluded to be so and, 2. when the cysts are so large as to be burdensome in anyway. In the former incision or possibly nephrectomy is advisable. If the ureter or other part of the purely waste-bearing portion of the corresponding half of the urinary tract be hopelessly obstructed beyond a period of six weeks, the function of the corresponding kidney will be permanently suspended and nephrectomy is preferable to incision or multiple incisions. But if urine is found to be pouring from both ureters then nephrectomy should not be done except in the very exceptional unilateral polycystic kidney. Were it at all apparent that the presence of the disease in one kidney had a tendency to stimulation of its development in the other kidney I would feel less positive in this matter. In the second condition puncture or incision seems applicable whether the disease be unilateral or bilateral. If cystoscopy reveals both ureters to be functionating, then, even though but one kidney be involved, nephrectomy should not be performed except in the rarest circumstances—such as hemorrhage limited to the affected side.

The Rochambeau.

THE ETIOLOGY AND PATHOLOGY OF BILATERAL POLYCYSTIC DEGENERATION OF THE KIDNEYS.*

BASED ON A STUDY OF TEN SPECIMENS IN THE ARMY MEDICAL MUSEUM.

BY
JOHN S. NEATE, M. D.,
Washington, D. C.

At a recent autopsy large polycystic kidneys were unexpectedly encountered. This event prompted the query, how do we know that this condition is ever congenital or inherited? In an effort to find a solution of this problem recourse was had to ten specimens, selected out of a series of thirty-three, from the shelves of the Army Medical Museum under the classification cystic disease of the kidneys. Nine of these specimens were of the type usually called congenital, eight of them were obtained from adults and one from a fetus, the remaining one believed to be the result of chronic nephritis was added to the list for the purpose of comparison. The twenty-three not included consisted of specimens with single or only a few cysts, hydronephrosis, kidneys from the lower animals and cysts associated with neoplasms.

It is not intended to describe these specimens in detail, one only, the latest acquisition, will suffice as fairly typical of the whole series. Reference will be made to the others when they serve to elucidate or emphasize some special points in the etiology or pathology of the condition brought out in this paper.

In the compilation of the accompanying table resort was made to the very meager data furnished by the contributors, all too incomplete for a thorough analysis of the clinical histories.

Bunting, (2) in a review of congenital cystic disease of the kidney, refers to the last summary which was made up to 1900 and comprised a total of 200 cases occurring in adults; ninety of these were denominated congenital.

We must recognize also that there is a remarkable family tendency. Virchow reported cases in which four of six children were affected.

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Synopsis of Ten Specimens of Polycystic Disease of Kidneys in Army Medical Museum, Washington, D. C.

No.	Museum No.	Sex	Age	Weight of kidneys	Contributor	Urinary symptoms	Cause of death	Remarks
1	7474 7475	Male	30 (?)	Left, 14 ozs.; right, 24 ozs.	Dr. Hilldreth, U. S. A., Washington, D. C.	None	Dysentery	. . . .
2	7611	Male	29	Left, 40 ozs.; right, 16 ozs.	Dr. J. Antisell, U. S. V., Washington, D. C.	Urination frequent, but normal.	Dysentery	. . . .
3	7955 7956	Male Male	3[illegible]	Left, ... right	Dr. W. Ure, U. S. A., Washington, D. C.	None	Typhoid fever . .	. . . .
4	8024	Male	21	Left, right, about 35 ozs. .	Dr. A. S. Gibbs, U. S. A., Philadelphia, Pa.	3 months of thick, turbid urine.	Peritonitis and pyonephrosis.	Pyonephrosis was secondary and terminal.
5	8950	Female	42	Left, 52 ozs.; right, 28 ozs.	Dr. H. Lippincott, U. S. A., Washington, D. C.	For several years; convulsions last few months.	Uremia	Bore 4 children.
6	12628	Fetus	8 mos	. . . .	Dr. E. E. Morse, Washington, D. C.	. . . .	. . . .	Breathed few minutes. Thorax encroached upon. Diaphragm impeded.
7	12749	Male	35	Left and right, 72 ozs.	Dr. J. C. Brown, Fort Niobrara, Neb.	For 7 months intermittently.	Nephritis.	. . . .
8	12923 12932	Male	(?)	Right, 21½ ozs.; left, 23 ozs.	Dr. J. T. Kelly, Washington, D. C.	Yes	. . . .	Removed at operation. Subsequently at autopsy.
9	13937	Female	29	Right and left, 80 ozs. . . .	Dr. J. W. Bovée, Washington, D. C.	Dating from delivery. None prior. 16 days.	Uremia	. . . .
10	8496	Male	49	(?)	A. J. Schafhirt, Washington, D. C.	For 9 yrs. dysuria, albumin and calculi.	Dysentery	Four phosphatic calculi in bladder.

Singer also reported a family in which the first, seventh, tenth, and thirteenth children had bilateral congenital cystic disease of the kidneys, the other children being normal. The condition has appeared in the second generation, and it is usually transmitted directly from father to son or mother to daughter. On the contrary, however, Osler(3) reports the transmission from mother to son. In about 20 per cent. of the cases the condition is accompanied by cystic disease in the liver, and in only 10 per cent. is the condition unilateral.

The difficulties which pathologists have encountered in attempting to explain this condition, since some regard it as a defect of development rather than a pathological change, has led to the promulgation of several theories which, in brief, may be classified as follows:

The obstruction theory.

The new-growth theory.

The malformation theory.

A combination of malformation and new-growth theory.

Virchow was the author of the obstruction theory. His explanation suffices for the type of cystic kidneys not usually considered congenital.

Many authorities have claimed that polycystic kidneys are analogous to the adenocystomata of the ovaries which have undergone colloid degeneration.

Kostner thought that the condition was due to a failure of the tubules to open into the pelvis.

To Shattock(4) and Bland-Sutton belongs the credit of the suggestion that it arises from a failure of the undifferentiated epithelium to grow in equilibrium.

The value of Shattock's observation lies in the fact that it was based on a case of bilateral cystic degeneration in a new-born infant, before secondary pathological changes had developed, and his theory was in accord with the best embryological knowledge of the time.

After reference to the frequent malformation of the kidneys and their association with malformations of other organs, such as hare-lip, cleft-palate, polydactylism, hydrocephalus, etc., he makes the significant statement "that the sites of the papillæ were occupied by cysts and that the intracystic tissue, while rich in connective tissue, was healthy."

Quoting Kölliker as to the development of the kidney, he says: "The renal tissue is formed by tubular extension from the upper end of the ureter; it may be conceived that the congenitally cystic kidney results from a want of differentiation of the metanephritic blastema from that of the mesonephros or Wolffian body. The proper tissue of the kidney grows into that of the Wolffian body and becomes mingled with it, while the remnants of the latter become the seat of the cysts scattered through the renal tissue."

In view of the frequency of cystic disease in the ovaries, prostate, and testicles, etc., organs which are developed from the Wolffian body and its duct, and originating in all probability from fetal remnants which ought to have atrophied, the theory of Shattock found a wide acceptance. But dissenting voices have been raised. Osler(3), after giving in substance the theory of Shattock, states: "But embryologists whom I have consulted on this point tell me that it is most unlikely." And so eminent an authority on antenatal life as Ballantyne refers to it as a disease of the fetus and inclines to the neoplastic theory.

It becomes evident, therefore, that we must turn to embryology for elucidation of the pathology of this condition. In this connection, the work of Schriener and Huber is of great interest. They have reconstructed the fetal kidney by the wax-plate method, and their results, considered final by Adami(5) and summarized as follows, are:

1. That the first indication of the fetal kidney is an evagination from the Wolffian duct near the cloaca. This elongates and becomes bulbous at the ends. The stalk is the future ureter; the ampulla expands longitudinally and is the anlage of the future pelvis and collecting tubules.

2. Running alongside the Wolffian duct is a cell mass of mesenchymatous origin, the nephrogenic tissue. At the anterior end this gives independent origin to the Wolffian tubes. Behind the renal ampulla penetrates into the mass.

3. The elongated ampulla (pelvis) gives rise to series of evaginations or branches, which proceed to dichotomize, developing the future collecting tubules.

4. The swollen or ampullary end of each branch becomes surrounded by a segregated mass of the nephrogenic tissue, and in the interior zone of this tissue there now form collections developing into vesicles—renal vesicles.

5. These vesicles elongate and fuse with the collecting tubules. Elongating still further and becoming S-shaped, the distal end by invagination gives rise to Bowman's capsule with its con-

tained glomerulus; the other portion of the S gives origin to the first convoluted tubule, the loop of Henle and the second convoluted tubule; in fact, to all the secretory portion of the renal tubules.

While thus an inflammation of the medulla in the later months of fetal life might bring about obstruction, the simpler explanation of the congenital cystic kidney is that of want of fusion between the renal vesicles and the outgrowths of the Wolffian duct. If the nephrogenic tissue proceeds to form renal vesicles without the renal ampulla proceeding to dichotomize and form from the collecting tubules, we should expect the universal cystic degeneration of the kidney; and this is precisely what we do find in 10 per cent. of the reported cases, viz.: those cases which occur in the new-born, in effect malformations of the secretory portions of the kidney, which must originate in the early months of fetal life.

For those cases which reach puberty, middle life and even old age, we must presume that the want of fusion is only partial and that there is embedded in the kidney cortex atrophic tubules or epithelial rests which are later awakened into activity by some special stimulus.

Many years ago noted embryologists, Thaysen, Brown, Sedgwick, Balfour, and Wiedersheim, advanced the view that the secretory portions of the kidney had a separate origin from the collecting tubules, and to this theory, Minot(6) in clear and vigorous language objects. He says: "My own observations enable me to affirm with confidence that the tubules arise as evaginations of the ureter, and that in man the convoluted tubules and Malpighian corpuscles arise as branches of the collecting tubules. The facts are so clear that it is difficult now to understand how the opinion could have been entertained that the convoluted tubules arose from the blastema, and not as outgrowths of the collecting tubules."

In support of this observation he marshals the names of Waldeyer, Toldt, Kölliker, Golgi, and Nagel, and the most recent text-book of embryology I have seen gives a brief review of both these theories and leaves the reader to choose between them.

The complexity of the histological picture in those cases which occur in adults owing to the secondary pathologic changes due to nephritis and sometimes infection and the theory that the origin of this condition is to be found in a fetal malformation render the study of cystic fetal kidneys most important.

Impressed by this consideration, a reexamination was made of the cystic kidneys of a new-born child which the Army Medical Museum owes to the courtesy of Dr. E. E. Morse, of Washington, which has been previously reported under the causes of dystocia, and the histopathology described by Dr. James Carroll, U. S. A. There is nothing to add to the description given by the latter, except the fact that at the risk of mutilating the specimen I was compelled to take several sections from it before evidences of kidney structure were found, so excessive is the connective tissue and so few are the dilated and atrophic glomeruli and the vestiges of tubules.

The rôle played by this excess of connective tissue cannot be disregarded in seeking the causation of this degeneration. Practically all the observers who have studied polycystic kidneys have referred to this excess. Shattock in his original article remarks "it may be said that the excess of intertubular connective tissue is a strong argument for the view that the cysts of the cystic kidney are urinary retention cysts resulting from irregularly distributed pressure," and a study of such kidneys as I have had opportunity to examine impresses one with the idea that this excess of connective tissue is not only an important factor in cyst formation but also an important agent in governing the development of the secretory portion of the fetal kidney.

Minot(6) was the first to call attention to the rôle played by the capsule of the embryonic kidney in the formation of the invaginations which give rise to Bowman's capsules, and the turning inward and twisting of the tubules. No one can examine a section of the fetal kidney without being struck by the fact that the young tubules grow up to the capsule and then meeting with resistance turn upon themselves, proceed then to invaginate and form convolutions. It would seem that the glomeruli continue to occupy their places when formed and that with the expansion of the periphery new ones appear, for the most immature are always found directly beneath the capsule.

Moreover, the substance of the growing kidney is relatively very rich in connective tissue. Now, the theory that renal vesicles first appear independently in the nephrogenic tissue and then proceed to elongate into very long narrow tubules presupposes the lateral pressure of this connective tissue as a primary factor in their evolution. It is not unreasonable to suppose that a lateral pressure equal to this work would require very little exaggeration to effect obliterations in some part or parts of the tubule; and the result would be isolated areas of epithelial structure which might atrophy or later be excited to cyst formation.

Again, the kidneys, which at first occupy the true pelvis, wander upward from a position in front of the second sacral vertebra, rotate at the midlumbar region, and finally reach their normal height about the end of the second month. And Pohlman(7) and E. C. Hill(8) have shown that they become vascularized after rotation has occurred and when they have assumed their final position. It is prior to this time that malformations of the secretory apparatus would occur, such as the want of fusion between the renal vesicles and collecting tubules, described by Adami.

"The(14) path of the so-called renal 'migration' is probably to a certain extent determined under normal conditions by the shrinkage of the Wolffian bodies, these massive organs of the earlier stages affording by their atrophy and degeneration a line of less resistance, to the advance of the permanent kidney. A process of this kind is, of course, subject to irregular, arrested, or misdirected development from various causes which we can properly regard as the primary etiological factors of many of the congenital displacements and fusion variations of the kidneys."

During this migration the kidneys are in close relation with the Wolffian body, elongated structures attached to the mesentery close to the dorsal wall. These bodies are provided with tubules which are very much contorted, encircle the periphery of the organ, and possess glomeruli similar in structure to those of the true kidney, but, according to McCallum, slightly larger. The space between the tubules is described by Minot as being lined with epithelium which gives evidence of a sinusoidal circulation.

The Wolffian body reaches its maximum of development at the seventh week, and at the eighth week commences to resorb (Ballantyne)(13). At this period the kidney is bean-shaped and possesses a well-developed smooth capsule. Coincident with the vascularization and rapid growth of the kidney the blood-supply to the Wolffian body begins to lessen and it gradually diminishes in size. The kidney, owing to its increased blood-supply and the vascularization of the glomeruli, becomes lobulated, from eight to sixteen well-marked indentations of its fibrous capsule develop, which disappear later, but sometimes they persist into adult life.

A little later, the relatively large adrenal becomes attached to the superior pole, while the degenerating Wolffian body covers even a larger surface of the lower pole, and, according to E. C. Hill's investigations, in the fetal pig is inseparable from it. Therefore, just as hypernephromata are assumed to develop from inclusions of the adrenal body pinched off by the advancing capsule, it is not unreasonable to suppose that portions of the degenerating tubules of the Wolffian body may be included within the rapidly growing kidney capsule.

Without taking sides in the opposing theories of embryology, we find there are sufficient probabilities in the development of the embryonic kidney to account for the inclusion of epithelial remnants capable of development into cysts, without considering the purely urinary retention cysts which develop in postnatal life from the obstruction and dilatation of normally developed tubules and glomeruli.

That these rests or inclusions remain latent is an inevitable conclusion from the clinical history of the majority of the cases, for the causes which operate to produce universal cystic degeneration in the fetal kidney, incompatible with life in 10 per cent. of the cases reported, are frequently delayed into middle life or even old age, or if not actually delayed, act so gradually and intermittently that the patients and frequently the physicians in attendance are unaware of any lesion of the kidneys existing.

Coplin(9) refers to a specimen in the museum of the Jefferson Medical College which is considerably larger than a fetal head. The organ was removed postmortem, and during life had given rise to but slight inconvenience, not at all lessening the comfort or usefulness of a physician throughout a long and active professional career.

Further, in the case of Nos. 1, 2, and 3 on the table herewith, three soldiers, with an average age of thirty years, the physicians who contributed the specimens were careful to note that there were no symptoms due to kidney involvement and death resulted in two cases from dysentery and in one case from typhoid fever.

These kidneys are of the large size, universally cystic, and indistinguishable from the type denominated congenital. Inspection at once reveals the dearth of proper kidney tissue and invites speculation as to their capability to function and the probability of compensatory elimination.

It is of interest in this connection that an estimate of the secretory area in the kidneys of Mrs. H. B. was made and compared with that of a normal kidney and found to be as 1 is to 15. That is, it possessed apparently fourteen-fifteenths less than the normal equipment. This approximation was obtained by counting the glomeruli, with the aid of a mechanical stage, for the reason that whenever patches of recognizable convoluted tubules could be found there would be found glomeruli. A number of sections were taken from the cystic kidney and compared with its area. These in turn were compared with the glomerular-bearing area of a normal kidney, with the above result. While it is recognized that such a crude method merely gives an indication, its error is known to be on the side of liberality to the damaged kidney.

Meltzer(10) says, "every man knows that one kidney can be removed with entire impunity if the other is normal. The amount and composition of the urinary secretion remains practically unaltered, and this even soon after the removal of the kidney. That can only mean that normally the kidney has an abundance of tissue which can do at a moment's notice at least twice the normal amount of work. From the experimental work of Tuffer, Bradford, and others, we know that at least two-thirds of both kidneys may be removed without serious detriment to the animal's life or to the secretory functions of the kidneys."

Similarly, when one kidney has been removed, hypertrophy of the secreting elements in the other begins within a few hours in an attempt to reproduce the luxuriousness of tissue on which our safety so frequently depends.

That we can dispense with two-thirds of the testicles or ovaries is equally true, and one-fifth to one-sixth of the thyroid gland is sufficient to provide for the demands of the organism. Much as we may depend upon the possession of these "factors of safety" in general, a secretory area of one-fifteenth of the normal in one kidney and even less in the other, or a total of one-eighth for both kidneys, leaves no reserve; and to supply the excretory need of the person we must believe have operated without intermission, and this without the occurrence of urinary symptoms for a period of twenty-nine years until the stress of pregnancy and parturition was added thereto, and demands the recognition of some if not all of the following propositions:

a. That there is established in these cases a high degree of compensatory elimination.

b. The presence of latent cysts, or

c. The gradual involvement of the secretory area of the kidneys by cysts not developed from embryonic inclusions or malformed tubules; *i. e.*, secondary cysts.

d. That the secondary cyst formation may be relatively gradual or quite prompt in development,

Cases illustrative of the last statement may now be briefly referred to.

C. M. Nicholson(11) has recently reported the case of a woman, aged forty-six, married, who complained for five years of difficulty in breathing, which at times was very severe. The attacks would last from one-half to four hours. Five months ago she noted an enlargement in the lumbar region which rapidly increased in size.

Lumbar incision exposed a large multilocular cystic kidney of the right side, the left being normal. The cystic kidney was removed and a good recovery made. The kidney, after evacuation of the larger cysts, weighed 1,400 grams.

The article is well illustrated and the histology fully described, and so far as one can determine from the printed page, the gross and microscopical pathology agree with that usually given for congenital cystic disease of the kidneys in the literature, and with those I have been able to review in the series in the Museum. A minor difference may, however, be noted in the fact that the writer states that the glomeruli were not involved and that the epithelium lining the cysts and the convoluted tubules was identical in appearance. I infer that he intended to convey the idea that there was little or no change from the characteristic type of epithelium found in normal convoluted tubules. Now, change in the epithelial lining of cysts is largely determined by the age, pressure and character of the cyst contents, and it is noteworthy in this case that the process of enlargement was observed during a period of five months prior to operation. His conclusion is positive that the cysts were developed from the urinary tubules and we must believe few if any originated from fetal inclusions or malformed vesicles, since the patient apparently recovered, which would seem to be an argument against its being of the congenital or inherited type.

After review of this case one is disposed to ask, what line of demarcation exists? What rule shall the pathologist follow in attempting to decide which are congenital and which acquired types?

Above all, how shall the surgeon decide, on the spur of the moment, whether the seemingly normal kidney he inspects in cases which seem to be unilateral does not contain latent cysts or vesicles potentially malignant?

In Case No. 8 of the Museum collection the right kidney, weighing 21 1/2 ounces, was removed by operation; subsequently the patient died and the left one was obtained at the autopsy and found to be of larger size, even more universally cystic, and to weigh 2 1/2 ounces more than the right. This seems to show that the process can develop from an unrecognizable state of latency with alarming rapidity; and a few surgical reports indicate that when nephrectomy was undertaken for cystic disease supposed to be unilateral, fatal results followed owing to the rapid development of a cystic condition in the remaining kidney.

Such a result is in agreement with the theories of fetal malformation and inheritance, for it is well known that homologous parts are apt to exhibit correlated variability, and this especially where variations of a congenital type are concerned.

Milward(15) divides the clinical history of the disease into three stages:

1. The stage of progressive enlargement of one or both kidneys without subjective symptoms. This may last from a few months to several years.

2. The stage of subjective symptoms and objective signs. This lasts from a few months to seven or eight years.

3. The stage of decreasing elimination of urine and uremia.

These stages are in part indicated in the accompanying table, and it is of interest to compare the absence of, or the comparatively short period of urinary symptoms in most of these cases with the long duration, nine years of dysuria and the presence of albumin and calculi reported in Case No. 10 not considered a case of congenital cystic disease, but a chronic nephritis, although the immediate cause of death was an attack of dysentery.

Somewhat an exception is that of Case No. 5, a woman forty-two years of age, who had born four children and had exhibited urinary symptoms for several years and occasionally convulsions during the last few months of her life; in her case the second stage was protracted.

Case No. 4 differs from the others in that a pyonephrosis with dilatation of the pelvis and upper portion of the ureter was added as a terminal event to the preexisting polycystic kidney, and death occurred from peritonitis; and while the history does not so state, probably the result of the rupture of an infected cyst.

It would seem that stage No. 1, without subjective symptoms, and it unquestionably occurs, is more or less incompatible with any general involvement of the kidney cortex in the malformation based on Schreiner and Huber's theory of development, with the consequent loss of function, unless we admit of very varied degrees of malformation and the latency of the separated renal vesicles, which when excited to cyst formation in turn through pressure and obstruction cause the development of secondary cysts in the normal secretory tubules.

Equally, if Minot's theory of development be the correct one, we must accept the inclusion of tubules or undifferentiated epithelium from the Wolffian body with the subsequent formation of cysts primary and secondary much the same as in the former process.

In either event in view of the remarkable family tendency, we must acknowledge the inheritance, in some sense, of acquired intrauterine malformations not of any value to the organism.

Before entering upon a discussion of this complex subject of inheritance, it is well to regard the observations of Adami(5) in his introduction to the "Causes of Disease." "Much confusion has been and continues to be introduced with the discussion of the inheritance of disease, as into that of heredity in general, by a lax comprehension and use of terms. By many "inheritance" and "congenital" are employed as though they were interchangeable; disturbances of the fetus, for instance, and conditions of intrauterine origin being by them regarded as congenital, but not as "inherited."

The individual begins the moment fecundation is accomplished. That alone, therefore, is inherited which is the property of the individual at the moment of his becoming an individual, which is part and parcel of the maternal and paternal "germplasm" from which he originates. Therefore, strictly speaking, every property possessed by the individual which is not and cannot be ascribed to intrauterine and postnatal acquirement is the inheritance of the individual.

It is not necessary that a peculiar feature or property of his inheritance should manifest itself in fetal life, it may appear in childhood or develop itself in old age.

The principles laid down by Weismann and Galton imply, that in no case can the identical mutilation or anatomical disturbance in the parent reproduce itself in the child.

A rigid adherence to these seemingly inflexible rules permits the use of the term "congenital," but not "inheritance." We cannot, however, lightly dismiss from our consideration the observations of Virchow, Singer, Osler, and others as to the family tendency in this condition

The practical trend of the mind of the average American physician little heeds long wordy discussions of post-Darwinian questions, but demands at once experimental evidence; therefore, in this connection the experiments of Brown-Séquard upon guinea-pigs, vouched for independently by Dupuy and Westphal and corroborated by Obersteiner and Romanes(12), offer to my mind analagous conditions of heritability. These in brief, comprised the following:

1. The transmission of epilepsy through injury to the spinal cord or section of the sciatic nerve.

2. Changes in the shape of the ears or the production of ptosis in the offspring through division of the cervical sympathetic.

3. The transmission of exophthalmos or gangrene of the ears through injuries to the restiform bodies.

4. Absence of two or three toes in animals whose parents had eaten up their toes which had become anesthetic through nerve section.

Since the epileptic condition may be produced by two or three different operations on the nervous system, it has been objected, that the result is only the inheritance of a generally unstable condition of the whole nervous system not associated with any particular part. However, the significant fact remains that the epilepsy was *transmitted* and through operation and in those cases, in which occurred the inheritance of malformed ears or the absence of toes their effects are sufficiently localized and definite in manifestation to escape the generalization "instability of the whole nervous system."

These facts admit of no other construction than that some part of the cortical area of the brain was deficient, degenerated, or malformed through the effect of operation on the parent and sufficiently potent to affect the "germ-plasm" and become an inheritance of the offspring.

Some such diathetic inheritance, more or less locally manifested, is all that can be included in a definition of the polycystic condition of the kidneys under discussion as to heritability.

Of course it will be understood that it is not the universally cystic, practically functionless kidney, in the condition which we obtain it at operation or an autopsy that is inherited; but a tendency to cyst formation, whether this occurs subsequently by development from a few or many fetal vestiges or in the normally evolved tubules.

Two very instructive cases have been reported by Bunting(16) occurring in premature children born of the same mother at an interval of eleven and a half months. Both were without gross malformations, well-formed, the kidneys of normal size, and the cystic condition, while universal, was rather microscopic than macroscopic in type, and associated with similar lesions in the liver and pancreas.

In describing them he says: "To summarize briefly, in two small children of the same parentage there was found a condition of hyperplasia of duct epithelium, with a tendency to cyst formation especially marked in the kidneys and liver, where there was also an increase in the number of ducts, occurring also to a less degree in the pancreas and possibly in the intestine." . . .

"These kidneys offered no evidence whatever in support of an obstruction or retention theory. The urinary path was open throughout from pelvis to urethra orifice. The children lived eleven and nineteen days, respectively, and passed urine freely and there was no constriction of the tubules."

He further states "that there is little evidence afforded to support the idea of any malformation or error in development." . . .

"The sole malformation, if it may be called such, was an active proliferation of the epithelium of the collecting ducts of the medulla and of the junctional tubules in the cortex."

In addition he notes the absence of an increase of connective-tissue growth in one child and its presence in the other where he observed that delicate fibrils exhibited a tendency to encircle the tubules and that this fact seems evidence that such sclerosis is a secondary phenomenon.

In reviewing these cases I invite especial attention to the following salient features:

The greater value of pathologic findings in polycystic fetal kidneys before secondary changes have developed.

The family tendency exhibited in these cases. That the children did not die as a direct result of the cystic degeneration.

The early recognition of excessive proliferation of cubical epithelium.

The connective-tissue growth encircling the tubules in the kidneys of one child only.

Contrasting these observations with the conditions found in the fetal kidneys of Morse in which fibrosis is so predominant a feature and that reported by Shattock in which the cyst formation was universal and the connective-tissue growth excessive, the conclusion seems justified that these are but different stages in the same process in which excessive epithelial proliferation first occurs before the retentive cyst formation is completed by the reactive growth of excessive connective tissue.

It will be recalled also that in the case of Mrs. H. B. this excessive growth of epithelium was observed obstructing the collecting tubules in one section examined from an area least involved in the cystic degeneration and adjacent to the pelvis.

It is with these facts in view that I have laid so much stress on the formation of secondary cysts, in effect a disease of the fetus or adult. For the fibrosis, pressure effects, the desquamated epithelium plugging the tubules and forming other cysts, which in turn lead to the excessive growth of more connective tissue, may be conceived of as a sort of vicious circle which destroys the function of the kidney rapidly or very slowly or only impairs it, depending for intensity of action on the degree of potency of the heritable factor.

Obviously, a malformation resulting in the death of a fetus is not a heritable condition—it limits itself.

The question of fibrosis brings into prominence the necessity of reconciling with our conclusions another fact, that in 20 per cent. of the cases reported there has been found the associated condition of cysts in the liver and fibrosis of the bile ducts. This condition has been noted by Adami, and in his opinion is caused by pressure and obstruction.

And in the cyst formation met with in some cases of chronic interstitial and parenchymatous nephritis we have to consider the same condition of fibrosis, obstruction, and pressure as causative or contributive factors. This type of cyst formation is exemplified in Case No. 10 of the Museum series and differs from the congenitally cystic kidney only in the size, number, and greater relative frequency of disposition of the cysts in the medulla of the organ.

Since not all the cases of chronic nephritis exhibit cyst formation and by no means all the kidneys which contain cysts beneath the capsule frequently of large size and congenital origin proceed to the formation of secondary cysts, but remain stationary after a certain stage of development, we are compelled to again resort for explanation of polycystic degeneration to an unknown factor which affects the equilibrium of the connective-tissue and epithelial elements of the kidneys in their growth, and this alone can be the heritable factor. This holds true whether we assent to a malformation theory in fetal development as the prime factor in this degeneration or, on the other hand, believe that the cysts are wholly developed in normally evolved tubules.

CONCLUSIONS.

The acceptance of a fetal malformation theory based on the failure of the renal vesicles to fuse with the collecting tubules, as a primary factor in the causation of congenital cystic disease of the kidney, requires also the acknowledgement that very many secondary cysts are formed in the medulla from the collecting tubules.

If, on the other hand, it is admitted that the primary cysts develop from inclusions of portions of the Wolffian body, then a still greater number of secondary cysts must be developed to account for the destruction of the organ.

Congenital cystic disease of the kidney is frequently accompanied by cyst formation in the liver and sometimes other organs; these are not assumed to be the result of fetal malformation, but attributed to the effect of pressure and obstruction.

Similar cyst formation and degeneration in the ovaries, testicles, broad ligament, epididymis, and prostate, while some of them arise in fetal vestiges are, as a rule, ascribed to abnormal secretory activity and obstruction and no theory of fetal malformation is invoked for explanation.

There is not sufficient difference in the microscopical pathology of these cysts whereby we can decide which are derived from fetal vestiges and which from normal tubules.

Primary cysts developed from fetal vesicles or inclusions can only be a contributory factor and not the chief agent in the general destruction of the kidney.

The condition is "inheritable" in the sense that a predisposition, a diathesis, or a tendency to cyst formation is inherited.

That this may be found in an excess or deficiency of nerve mechanism governing the growth of kidney cells or the presence or absence of some special secretion is only conjectural.

It is "congenital" in those cases which are of intrauterine acquirement, but there are no grounds for excluding its development in postnatal life.

Since a fetal malformation as such cannot be inherited but only a tendency to cystic degeneration; and since a malformation theory involves so much secondary cyst formation; may we not exclude any malformation theory and regard the process as a disease from the beginning.

This view does not exclude cases in the new-born because the kidneys functionate to some extent in intrauterine life, and if there is any disability on the part of the placenta as an excretory organ, additional strain will be thrown on the kidneys of the fetus at the most plastic period of its history with probably the formation of urinary retention cysts.

In view of its inheritability, that over 90 per cent. of the cases are bilateral, and that some in which nephrectomy was done in supposed unilateral cases subsequently showed cystic degeneration in the remaining kidney, removal by the surgeon can be rarely considered justifiable.

The thanks of the writer are due to the curator, Captain F. F. Russell, Medical Corps, U. S. Army, to Dr. D. S. Lamb, of the Museum, for an opportunity to study these specimens, to Dr. W. M. Gray for the photographic reproductions herewith, and to Dr. J. Wesley Bovée for permission to report his case.

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SUDDEN DEATH FOLLOWING SPINAL ANESTHESIA.*

BY
CHAS. B. REYNOLDS, M. D.,
Assistant Obstetrician and Gynecologist to the Philadelphia General Hospital; Assistant Obstetrician to the Medico-Chirurgical Hospital; Instructor of Obstetrics Medico-Chirurgical College,
Philadelphia, Pa.

REPEATED observations on the subject of general and local anesthesia have stimulated surgeons to search for an anesthetic which is free from the disagreeable after-effects of ether and chloroform and will produce a degree of analgesia sufficient to abolish pain without inhibiting the functions of important organs, as the heart, kidneys, and lungs, especially if they show degenerative changes.

The ideal anesthetic is one which will abolish consciousness and pain without endangering life or producing unpleasant after-effects.

The relative advantages of general anesthesia by inhalation of ether and chloroform and that produced by the intraspinal injection of cocaine, eucaine, stovaine, and tropococaine have caused the advocates of the latter method to experiment with solutions of varying strengths and densities and improve their technic.

For prolonged operations ether and chloroform properly given are the most reliable general anesthetics despite their irritant effects upon parenchymatous structures and unpleasant postanesthetic symptoms, as nausea, vomiting, headache, etc.

The discovery of cocaine and its value as a local anesthetic in painful conditions of mucous surfaces and for minor operations have caused it to be used extensively and broadened its field of usefulness.

On account of its toxic influence in susceptible patients two synthetic products, eucaine and stovaine, which are equal in anesthetic power but less toxic are being widely used.

Tropococaine, a drug closely allied to cocaine and derived from the leaves of the Java coca plant, is being much used in Germany by Bier as a lumbar anesthetic.

Spinal anesthesia has a limited field of usefulness, being employed in operations below the umbilicus where brilliant results have been achieved without pain, loss of consciousness, or disagreeable postanesthetic effects. It is indicated in advanced cases of tuberculosis and nephritis where ether and chloroform are contraindicated. In nervous patients and young children the preparation for operation, the rattle of instruments, and general commotion in an operating-room tend to frighten them, and in some instances induce collapse. The after-effects become perceptible as soon as the analgesia ceases. They comprise headache, backache, nausea. Less frequently are retention of urine and paresis of lower extremities.

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The first reports of spinal anesthesia published were highly favorable; this was followed by the inevitable reaction, failures and deaths being reported.

Bier (*Deutsche Zeitschrift für Chirurgie*), the pioneer worker on spinal anesthesia, after experimenting with cocaine, eucaine, and stovaine, relies upon tropococaine in doses of .05 to .06 c. gm. with suprarenin .0001 combined in tablet form and placed in the syringe to be dissolved in the spinal fluid when it is withdrawn into the syringe at the time of puncture. From 1 to 10 c.c. of fluid are used, depending upon the height of anesthesia desired. One c.c. for operations on the perineum and 10 c.c. for abdominal operations. In one of his cases .13 c. gm. (gr. 2) caused death. This was the first fatality in over 1,000 cases and was attributed to an overdose of the drug. A. E. Barker (*British Med. Journal*, March 23, 1907) in a series of 128 cases used stovaine in doses of 3 to 6 c. gm. with satisfactory results.

W. W. Babcock reports seventy-six cases in which stovaine or alypin in combination with adrenalin chloride were used. Stovaine was used in sixty-five cases. He reports one death in a debilitated alcoholic with a comminuted fracture of the femur caused by a heavy cart passing over his thigh. Ten minutes after the injection of alypin .064, adnephrin .00013, water 2 c.c., the patient complained of great oppression in the cardiac region, struggled, and plucked violently at the chest. Relaxation and death supervened. Postmortem examination revealed separation of vessels and nerves in Hunter's canal, chronic nephritis, chronic hepatitis, edema of lungs. Death in this case may have been due to an embolis; but the author urges caution in the intradural injection of synthetic anesthetics in doses over 4 cgm. in patients with marked cardiac depression.

Urban (*Wien. med. Woch.*, 1906, Nos. 51 and 52) reported a death preceded by delirium and great dyspnea two days after an injection of 1 gr. of tropococaine in a man thirty-one years of age operated upon for double inguinal hernia.

Klose and Vogt (*Mitteilungen aus den grensgebieten der Med. and Chirg.*, Jena), in a series of experiments with spinal anesthesia on 103 dogs and rabbits, report changes in the cord showing swelling with achromatosis of the large motor cells of the anterior and lateral horns. In most cases the changes were reparable, but in some the nuclei showed such pronounced changes that restitution was practically impossible. These changes were not found until after a few days or weeks.

F. Legueu (Paris) stated that he has discontinued the use of cocaine by the spinal method on account of the danger. As a result of 350 operations under stovaine he believes the anesthesia is insufficient in one-seventh of the cases. Cardiac accidents, violent meningeal reaction, persistent paraplegia, and incontinence of urine may ensue in days or months following.

Bruning (Gottingen) has used spinal anesthesia with stovaine, tropococaine, or novococaine in 450 cases. He has seen three deaths—paraplegia with ascending pyelonephritis, arrest of respiration with death on the table, and cerebral hemorrhage. He has also noticed persistent pain in the back and legs for one and one-half years after the operation.

On the other hand, M. Sabidini (*Archives Generales de Chirurgie*, Aug., 1908) reports 108 cases of spinal analgesia with stovaine, and claims it may be used without danger from fifteen years till advanced age. He uses 5 to 10 c. gm. which affords complete anesthesia lasting one and one-half hours. Constitutional disturbances are slight and seem to be less frequent than with cocaine. He has noticed quite frequently urinary retention which persisted from one to several days.

One of the most annoying and persistent symptoms following spinal anesthesia is headache, which is reported by practically all writers. Alfred Newman (*Merck's Archives*, Aug., 1908) reported 17 2/3 per cent. after tropococaine, 18 2/3 per cent. after cocaine, and 72 8/11 per cent. following stovaine. Deetz had 14 per cent. in 360 stovainizations. Tuffier, using cocaine, 40 per cent. Hauber, 46 per cent. following stovaine. Lexer noted severe headaches lasting for days in 25 per cent. of his cases.

Various theories have been advanced as to the cause of headache, but the most plausible one is that of increased intracranial pressure. Offergeld (*Centralblatt für Gyn.*, vol. xxxi, No. 10;

ref. *Journal A. M. A.*, May 11, 1907) demonstrated increased pressure in rabbits, and applied this knowledge for the prevention of headaches in human beings by withdrawing 1 to 2 c.c. of spinal fluid before injecting the anesthetic.

Newman (*Marck's Archives*, Aug., 1909) reports a few cases in which the fluid was withdrawn, none being followed by headaches. In the Bier clinic from 1 to 10 c.c. is allowed to run off.

Adrenalin has been tried with varying results; Newman states it has been proved absolutely valueless in sustaining blood pressure or avoiding the disagreeable after-symptoms. Biberfeld (*Deutsch med. Woch.*, No. 14, 1907) in experimenting on animals, noted paralyses of the legs in cats and rabbits as a consequence of the spinal anemia. It is a powerful irritant capable of inflicting damage to the spinal cord. Death due to the poisonous effects of cocaine, eucaine, stovaine, and tropococaine injected into the spinal canal is preceded by restlessness, anxiety, oppression in the region of the heart, respiratory embarrassment, cool skin, weak irregular cardiac action, and in some cases delirium.

Our experience with spinal anesthesia is limited to two cases. One, a negress, age eighteen years, primipara, pregnant near term, was admitted into the obstetric ward of the Philadelphia Hospital, service of Dr. Geo. M. Boyd, March 31, 1909. Her father died of pneumonia and mother of apoplexy. Menses began at the twelfth year, regularly every twenty-eighth day, lasting four days. No history of abortions, miscarriages, or venereal infection.

Physical examination revealed a well-developed, healthy-looking woman, with heart and lungs in good condition. Pelvic measurements were somewhat less than normal, fetus in L. O. A. position. Labor began at 5 P. M., April 6, membranes ruptured at 3 A. M. the following morning, head immovable at the inlet. At 12 noon the head was still at the pelvic inlet.

A high forceps operation was performed under ether anesthesia and the patient delivered. There was a bilateral tear of the cervix and lateral tears involving the vaginal sulci.

An immediate repair was not attempted on account of the long tedious labor, edematous condition of the tissues and exhausted state of the patient. On the fourth day of the puerperium patient was prepared for an intermediate operation on the cervix and perineum.

She was placed upon the operating-table in the sitting posture with the head and shoulders inclined forward and the limbs hanging over the edge of the table. The back was thoroughly cleansed with tincture of green soap, sterile water, alcohol, and ether. The fourth lumbar spine was located by a towel stretched between the iliac crests. The skin was anesthetized by injection of three minims of a 2 per cent. cocaine solution. A sterile irido-platinum needle provided with a stylet was introduced into the third lumbar interspace one-third of an inch to the right of the median line and directed toward the middle, between the vertebræ until the interspinous ligament was reached. The stylet was then withdrawn and the needle pushed gently forward until spinal fluid exuded from it. Four c.c. of clear spinal fluid was allowed to run off. The glass syringe containing 4 c.c. of sterile water with 7 c. gm. of eucaine was attached to the needle and the contents injected slowly into the spinal canal. The wound was then sealed with collodion. Patient was placed in the dorsal position with the head and shoulders slightly elevated. Ten minutes after the injection she said she felt no pain while the field of operation was being cleansed. At the beginning of the operation the pulse was 88 and of good volume, temperature normal, and respirations 18. While the cervix was being repaired the patient said she felt "all right." Suddenly the nurse who was counting the pulse exclaimed that it was very weak. An examination revealed the patient in a state of collapse. Artificial respiration, strychnine sulph. gr. 1/30 hypodermically, oxygen and the injection of saline solution into the radial artery failed to revive her. The pupils were equal and moderately dilated.

Postmortem examination revealed chronic parenchymatous nephritis, beginning arteriosclerosis in the aorta and left coronary artery. Brain and cord were normal, there being no evidence of traumatism or coexisting disease of the cord. The cause of death is problematic, as there were no evidences of restlessness or respiratory disturbance preceding the collapse. It may have been due to an embolus or the action of the eucaine on the higher cerebral centers. We believe, however, that spinal anesthesia should be used with great caution and the patient watched carefully until its effects have worn off.

2003 DIAMOND STREET.

ADHESION OF THE PLACENTA.*

BY

W. REYNOLDS WILSON, M. D.,
Philadelphia, Pa.

ADHESION of the placenta occurs as the result of definite pathological change. Reviewing the histology of the placental decidua, we find it divided into a spongy and compact layer. The former constitutes the greater part of the membrane. It is composed of glandular spaces separated by scanty stromal trabeculæ. The glands are lined with epithelium which, for the most part, has undergone degeneration. Their ducts have become obliterated. The compact area is composed of decidual cells massed together in a layer which overlies the villi and transmits the vessels connecting with the placental sinuses. It is this layer which presents on the maternal surface of the detached placenta.

The separation of the placenta takes place through the spongy or glandular area of the decidua. The latter offers through its laxer tissue a favorable plane of cleavage in the presence of the uterine contractions. Preparatory to its physiological detachment the placenta shows degeneration in the deposit of fibrin which has replaced the syncitial cells, and in the obliteration of the arteries.

With these facts in view the histological changes underlying adhesion of the placenta assume their proper bearing. In the milder grades of adhesion an abnormal adherence between the compact and spongy layers of the decidua has been demonstrated in the detached placenta. The decidual layer in such instances has undergone a change into spindle-cell tissue which has invaded the septa between the glands. This gives an impression of undue denseness in the maternal layer. It explains also the dislodgment of portions of the spongy layer from the uterus through adhesion to the surface of the placenta. In instances of complete adhesion the decidua serotina is either totally deficient or is present only in part. In the latter case the spongy layer shows only occasional glands or remnants of glandular tissue. The compact layer as well becomes atrophied. The latter is also the seat of changes which impair its resistance to the invasion of the growing villi. As a consequence the latter penetrate the sinuses of the musculature. The villi fill out the lumina of the sinuses and become applied to their walls as a result of thrombosis. Thus the attachment between the fetal portion of the placenta and the muscular wall of the uterus becomes direct.

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* Read before the Philadelphia Obstetrical Society, meeting of March 4, 1909.

The supposition toward which earlier writers inclined, that adhesion occurs as a result of endometritis is, in the light of recent research, scarcely correct. It has been shown that the infiltration of the decidua with round cells, even to an extensive degree, as may occur in syphilis, may exist in cases in which the separation of the placenta occurs without the least abnormality. The presence of connective tissue in the placenta may not properly be interpreted, therefore, as a result of interstitial endometritis, but rather as the result of changes of fetal origin.

Atrophy of the mucous membrane may be regarded as a cause. The changes in the decidua bear a certain analogy to the condition found in adhesion of the placenta in myomatous uteri, where the mucous membrane has undergone atrophic change. The absence of the glandular layer in adhesion may likewise be due to atrophy. Further, the imperfect reconstruction of the mucous membrane after labor in some instances may be followed by placental adhesion. This accounts for the more frequent occurrence of adhesion in multiparous women.

We are, however, bound, in studying the subject from this point of view, to the consideration of the fetal origin of adhesion by the fact that in the majority of cases while the serotina is deficient, the decidua vera is normally present. Therefore, we may assume that in cases where the vera is normal the serotina has existed intact at an earlier period in pregnancy. Thus, the pathological condition has arisen not on the side of the mother, but through an anomaly of fetal origin. We must accept as established the fact also that in the early stages of embryonic change the relationship between the uterine area of implantation and the ovum must be normal in order to limit the destructive growth in the cells of the latter. Where this relationship fails, the villi penetrate the compact layer of the decidua. As a consequence, the invading progress of the villi bring them into direct contact with the musculature.

Such a condition is described by Freund and Hitschmann (*Winckel's Geburtshülfe*, 1905, Bd. II, T. 3, S. 2242) in reviewing the histologic findings in a specimen obtained from a four months, gravida; the embryo was 11 1/2 cm. long.

Decidua vera: this is about 1 2 cm. in thickness, well developed and distinctly separable into a spongy and compact layer. The decidual cells are normal. The glandular area presents the characteristic reticulated structure.

As to the serotina, when studied with the low power, it reveals areas in which the structure is deficient and where even the decidua is totally absent. The villi have penetrated the spaces thus formed and in some instances they are found lying directly in the sinuses. The spongy layer is practically absent, that is, in the sense of its existing in its typical aspect. Here and there, adjacent to the spaces due to loss of structure, are found occasional glands. Where the serotina remains there is a distinct structural change. The decidua is invaded here and there by a dense aggregation of Langhans's cells mingled with the decidual cells. The latter, where they are not encroached upon by the fetal cells appear characteristically rich in protoplasm with relatively small nuclei, whereas, in the neighborhood of the invading cells they have undergone hyaline degeneration. The syncytial cells have penetrated to the grandular area and have surrounded the glands and in some instances migrated to within the lumina of the latter. The infiltration has extended even to the musculature.

The presence of the trophoblast in specimens taken from placental adhesion during this early stage (four months) suggests its persistence as a pathological factor in the invasion of the maternal tissue.

A case of complete placenta previa which recently came under observation at the Philadelphia Lying-in Charity (Boyd and Wilson) presented clinically the condition described above. A pluripara, aged forty-one, was admitted on account of sudden profuse hemorrhage occurring in the middle of the ninth month. Placenta previa was diagnosticated. It was noticeable on examination that the lining of the partially dilated cervical canal was thick and yielding. On introducing the speculum this proved to be an overgrowth of decidual tissue in the canal. In extracting the placenta it was found to be densely adherent and in its removal the overgrown portion which had invaded the cervical canal was so adherent to the edge of the external os that it was practically inseparable from it. It was difficult to determine where the decidual tissue ceased and the mucous membrane at the edge of the os began. In the detachment at this point shreds of decidua were necessarily left on account of the difficulty experienced in making a clean detachment. This, of course, is not altogether exceptional and has been recorded by Weiss, Keilmann, Küstner, and others. It is, however, an illustration of the invasion of the maternal tissued by the serotina and of the tendency for the latter to become adherent where the proper source of nutriment is deficient through badly vascularized or degenerated tissue.

In this connection it is interesting to note that the decidual tissue has been found to have invaded the muscular tissue in the neighborhood of the Cesarean cicatrix in the uterine wall extending even to the serosa and causing rupture of the uterus in a succeeding pregnancy. (Brodhead, AMER. JOUR. OBST., vol. lvii, No. 365, May, 1908.)

The occurrence of adhesion more frequently in multiparous women is not of sufficient importance to exclude the possibility of it in practically any case that may come under observation. Primiparous women are perhaps less liable. The absence of symptoms during labor makes it impossible to foretell adhesion.

It is possible to determine the presence of an adherent placenta only by the occurrence of bleeding in the third stage of labor or by retention. The amount of bleeding depends upon the extent of adhesion; in partial adhesion the hemorrhage is likely to be severe; in instances of complete adhesion there may be no bleeding. The recurrence of uterine contractions and the upward displacement of the uterus fail to appear. But the actual knowledge that adhesion exists comes with the failure to expel the placenta by compression. In making traction upon the cord a characteristic backward pull will be communicated from the point of placental attachment. If in badly conducted cases the traction be too vigorous, the fundus will disappear from beneath the palpating hand and the placenta as it appears at the vulva will be followed by a smooth mass—the uterine surface covered with amnion—indicative of artificial inversion, an accident easily met with where the diagnosis of adhesion has not been suspected.

Complete adhesion is usually described as a rare condition. It occurs frequently enough, however, to demand that a careful examination be made in instances in which efforts at expulsion fail after a proper interval. In the presence of bleeding the operator allows no time to be lost, but in the absence of bleeding the expectancy which permits him to wait may place the patient in danger from the shock which follows when the artificial detachment is deferred. In all doubtful cases careful intrauterine palpation should be made. Without this complete adhesion may be overlooked, as the uterus may even be fairly well contracted, thus giving the impression of normal involution in the presence of incarceration of the detached placenta.

In cases of partial adhesion the bleeding begins with the separation of the nonadherent portion. It is usually so extensive as to demand the introduction of the hand within the uterus to determine the degree of adhesion, and to hasten the extraction of the placenta. The fingers are to be pushed up until the point of beginning detachment of the placenta is reached, and by a side-to-side motion are insinuated rapidly between the placenta and uterine wall. The direction of cleavage should be away from the fetal surface, otherwise the compact surface of the placental decidua will remain attached to the uterine wall and will interfere with contraction. As a result the hemorrhage will continue. Allowance should be made for the thinning of the musculature at the point of attachment, but the operator's hand, which is used for palpation applied to the fundus, will serve as a guide. As the placenta is detached, the hand grasping it is to be rotated. The membranes will thus be dislodged and expelled as the hand is withdrawn.

In most cases the compact layer of the decidua comes away with the placenta. Notwithstanding this, a marked unevenness of the placental site is often found. This is usually composed of muscular tissue and is the result of local hyperplasia due to pathological attachment. Remnants of placental tissue which are sometimes responsible for the formation of placental polyp are not apt to remain as the result of complete adhesion. They are more apt to occur from the breaking away of a placental lobule in spontaneous extrusion or in the process of expression. A difficulty sometimes arises through the denseness of the membranes at the periphery of the placenta. Here the adhesion between the chorion and decidua is such as to make it almost impossible to penetrate the membranes. Thus considerable time may be lost in attempting to find a point at which cleavage begins. It may be even necessary to begin the separation at a point considerably removed from the placenta. The manual detachment of the placenta is sometimes accompanied by severe shock, not always the result of bleeding. The indication for packing the uterus is usually, however, not present. Some authors allude to the danger of uncontrollable hemorrhage, but although this danger is to be reckoned with, usually the complete removal of the placenta is followed by uterine contraction. One point should be borne in mind, however, that is, that copious bleeding may follow detachment of the placenta by reason of the line of cleavage not corresponding with that layer of decidua in which the minute vessels are normally constructed. Thus the protection to hemorrhage may be lost by the continuation of the vascular supply to the intervillous spaces of adherent remnants. Such hemorrhage would not be as severe as that due to failure of contraction at the placental site, but at the same time it might be more continuous.

The deductions, therefore, to be drawn from this review of the subject are, first, that adhesion of the placenta occurs through overgrowth of the fetal portion from the necessity in some instances of securing the proper source of nutriment; second, in a practical sense, that the presence of complete adhesion should be suspected in cases where in the third stages of labor efforts at expression fail, especially in the absence of bleeding.

1709 SPRUCE STREET.

THE UTERINE TAMPON IN POSTPARTUM HEMORRHAGE.

BY

T. J. CROWE, M. D.,
Dallas, Texas.

SEVERAL years ago I read in one of the representative journals a paper, from the pen of a professor of obstetrics, condemning the uterine tampon as worse than useless, often positively injurious in the treatment of postpartum hemorrhage.

Had this paper been contributed by a recent graduate, it might have passed unnoticed, but coming, as it did, from a man whose teaching and writing carry conviction to hundreds of students and young physicians without experience sufficient to disprove his assertions, it should not have been allowed to go so long unanswered, because, when properly applied, the tampon is both effective and safe.

Fortunately, postpartum hemorrhage is not of frequent occurrence. Many a physician has gone through a lifetime service without witnessing a genuine case. Many of the reported cases have been little more than hemorrhage from vaginal and cervical lacerations. I have witnessed rather troublesome bleeding from tears in the anterior commissure on either side of the urinary meatus, also from a badly lacerated cervix; but these, while troublesome, are neither as alarming or dangerous as real postpartum hemorrhage, which, when it does occur, places the physician face to face with a very alarming and dangerous condition, and one that will tax his skill and ingenuity, if life is to be saved.

This is one of the conditions in which a few minutes will determine the result—whether life is to be saved or lost, and where a cool head, a clear brain and a ready hand may snatch from the grave, as it were, a human life. It behooves us, therefore, to hold fast to that which is effective, notwithstanding the condemnations of a few.

That the tampon has failed and that it has been the carrier of infection, I do not question, but that is the fault of the man who applied it, and not of the tampon.

Because some bungling farm-hand misapplies the forceps and destroys a woman's life, must we abandon the forceps? The forceps or any other instrument is dangerous in the hands of a man who does not understand the nature of the condition with which he is dealing nor the scientific use of the instrument with which he is trying to meet it.

That we may know how to control postpartum hemorrhage it is necessary that we should understand the condition under which it occurs. What is that condition? There is but one answer: Uterine relaxation. How is the presence of relaxation determined? By palpation through the abdominal walls.

When the uterus can be found as a solid, pear-shaped tumor, about the size of the closed fist, midway between the umbilicus and pubes, it is firmly contracted, and hemorrhage, if present, must be sought for elsewhere than from the cavity of that organ. When it cannot be definitely located or made to contract, by kneading, manipulation, etc., so that it can be distinctly outlined, it is quite likely that the flow, if any, is coming from the open sinuses in the cavity of the relaxed uterus, and then, if resort to the usual measures fail to cause contraction and stop the bleeding, the tampon is a last resort and, properly applied, a veritable life-saver.

I say this without fear of successful contradiction, and that, too, in the face of the fact that I have heard learned professors say that the womb would on such occasions swallow up a hatful of gauze without appreciable result.

To effectually apply the uterine tampon, it is necessary that the obstetrician should know how hemorrhage from other parts of the body, as the nose, an alveolar cavity, or even a limb, is stopped by tampons and pads. We know that we can stop such hemorrhages only by compressing the walls of the bleeding vessels between a pad and a bone or some other resisting substance with sufficient force to obliterate their lumen. Why, then, should we expect to check the rush of blood from the uterus, in a case of postpartum hemorrhage, by simply stuffing its cavity full of gauze, applying pressure to the vessels on one side only?

If the muscular tone of the uterus is sufficient to furnish its own resistance, as is the case in miscarriage during the early months of pregnancy, firm pressure from the inside by a tampon will be sufficient to control any hemorrhage that may occur, but, unfortunately, this muscular tone is the very thing that is lacking when we have hemorrhage following labor at full term.

The manipulation incident to packing a relaxed and bleeding womb may cause the organ to contract upon the tampon and, for a time, check the flow of blood, but its overdistended, semiparalyzed walls will again relax after the packing is placed and bleed as violently as before. This is why the tampon has been considered ineffectual and why it has been so bitterly condemned.

The failure of the tampon in such cases is due to the mistaken idea that filling the cavity of the womb with gauze should stop the flow of blood without counterpressure other than that furnished by its muscular walls.

That the proper application of the tampon will stop hemorrhage from the womb as elsewhere in the body is proven by the following report of a case which will sufficiently describe what I consider the proper method of applying counterpressure to the bleeding vessels and amply demonstrate the value of the procedure.

Several years ago I was engaged to attend Mrs. A., the wife of a division commander in the Salvation Army, during her confinement. She was then the mother of two children whose entrance to the world had occurred without untoward incident. She was healthy and robust; family and previous personal history negative.

I made the usual urinary and preliminary vaginal examinations: the urine was negative, presentation and position normal.

About a week before the expected time I was called to see her. When I arrived at the house I found her suffering severe pain in the right side, just above and to the left of the anterior iliac spine. There was no tenderness to touch or pressure. She had been suffering for nearly twenty-four hours when I saw her, but said nothing about it until she noticed a slight flow of blood from the vagina which led her to believe that labor was coming on and that I should be called.

The discharge was so slight that I gave it little attention further than to ascertain whether or not labor had commenced. Failing to find any evidence of uterine contractions or cervical dilatation, I left her a prescription for the pain with instructions to call me if she had any further trouble.

Six days later I was again called, and when I reached my patient, at 2 o'clock A. M., found her squatting in the middle of the bed in an agony of pain, which did not cease until, twenty minutes later, the baby and after-birth together were violently expelled, and following them came a torrential rush of blood. I at once realized that I had a desperate condition to deal with and promptly resorted to the usual methods for controlling it, but, in spite of my kneading, clearing out of clots, hot douching, etc., the flow continued unabated until, by introducing my right hand into the vagina and seizing the cervix and with my left grasping the fundus, I succeeded in doubling the uterus upon itself and applying pressure, when I had the hemorrhage temporarily under control. In the meantime the woman was nearly exsanguinated, complaining that she could not see and struggling for air.

Thus I held the womb for twenty minutes, during which time I got a breathing spell and a chance to decide what I should do if the hemorrhage reappeared when I released it. After twenty minutes I relaxed without removing my hands; immediately the flow was resumed as violently as before. I then instructed the husband to hastily call Dr. C., who resided but two blocks away. The doctor responded promptly, and I requested him to prepare for packing while I maintained pressure, and thus avoid any further loss of blood while gauze, instruments, etc., were being sterilized. When all was ready I withdrew my hand from the vagina and the doctor commenced packing the uterus while I continued to hold the fundus so that the organ might be steadied and kept contracted. The uterus and vagina firmly packed, I released the fundus and waited to see if our efforts had been successful. I did not have long to wait, for in less time than it takes to tell it the packing was saturated and a steady stream of blood flowing from the vaginal orifice.

Realizing that we had failed, I again grasped the fundus and forced it down against the packing, at the same time instructing the doctor to secure three towels and a sheet; each towel to be folded and rolled into a solid cylinder three inches long and two and a half in diameter; the sheet to be folded so that it could be used as a binder. Having been secured and prepared, I placed one of the towels above the fundus and one on either side of the uterus, extending from the transverse pad to the pubes, and fixed them with the binder drawn as tight as possible. This held the womb in a solid box, as it were, with the spinal column behind, a solid pad on either side and above and the binder in front.

Having thus forstalled any possible relaxation beyond the space within my splints, I hastily withdrew the vaginal packing and added the length of two sterile gauze bandages, one inch wide to the packing already in the uterine cavity and repacked the vagina. This effectually stopped the hemorrhage, and so completely that the new vaginal packing was not even soiled when removed.

The hemorrhage stopped, I turned my attention to the baby and after-birth; on inspection of the latter I found what appeared to be the cause of all of my trouble. In the center of the placental mass, on the maternal side, I found a firm blood-clot, about the size of a fetal head, thoroughly adherent and apparently several days old. This it was that caused the pain in the side and the slight discharge of blood which made its appearance several days before labor commenced and continued until the baby was born.

This enormous clot had so distended the segment of uterus above it that it was paralyzed and incapable of contraction, as is the overdistended bladder after prolonged retention, consequently the sinuses remained open and poured out a torrent of blood that nothing but properly applied pressure could stop. The increasing tension over the steadily growing clot probably accounts for the pain in the side, complained of during my first visit.

That the reader may have a better conception of the position and size of the clot I shall describe the combined mass as hat-shaped: the clot corresponding to the crown and the free margins of the placenta to the rim of a hat. The remarkable thing about it is that enough of the placenta remained attached to save the child, which was born alive.

I have never heard of another case of postpartum hemorrhage where splints were used, as in this case, to secure counterpressure for a tampon. If any have been reported I have overlooked them. I have treated several cases by the same method, but all of the others were slight hemorrhages which could have been controlled, no doubt, without the outside padding.

Aside from neuralgic pains which lasted for two days and at one time or another involved almost every portion of the body, even the fingers, this woman's convalescence was uninterrupted, notwithstanding the fact that, in his haste, the doctor forced the steel rib from the Cook packer into the womb, from which it was removed with the gauze thirty-six hours later.

The after-treatment consisted of a pint of saline solution hypodermically immediately following the final packing, and high elevation of the foot of the bed, which I had resorted to before assistance was called. I had to keep this woman in the inverted position for more than a week, dropping the foot of the bed a little each day until the horizontal was reached. Because of the sliding toward the head of the bed and other discomforts complained of by the patient, I made several earlier attempts to drop the foot of the bed all the way down, but in each instance she became dizzy and faint, and it had to be returned.

Those of my readers who have had a similar experience can appreciate something of the trials of that dreadful night which, fortunately for the patient and myself, terminated more happily than I, at one time, thought it would. Until Dr. C. came I had no help except what I got from the husband, who was so badly frightened that he was worse than useless.

While I do not presume to question the opinions of physicians of mature judgment and large experience, I consider one well demonstrated fact of more practical value than a volume of theoretical speculation. I contend, therefore, that the uterine tampon with properly applied counterpressure is a successful method of controlling postpartum hemorrhage, and when due precautions to secure asepsis are taken, there is little danger of infection. In any event, the hemorrhage must be controlled, and the risk of infection, which is of secondary importance, must be taken.

Before concluding this paper, I wish to say that I have always made it a practice to go to every case of labor prepared for any emergency, always anticipating hemorrhage, and I shall continue to do so. My obstetrical bag is unnecessarily heavy and cumbersome forty-nine out of the fifty times I carry it, but I prefer the load to parting with the sense of security it gives me.

252 BROWDER STREET.

HOW FAR IS THE SO-CALLED CONSERVATIVE PELVIC SURGERY CONSERVATIVE.*

BY
J. THOMAS KELLY, JR., M. D.,
Washington, D. C.

SOME years back, after the advent of gynecology as a speciality and when men wholly untrained in the pathology of the female sexual organs removed those organs for symptoms, frequently neurasthenic, one might see in almost any hospital numbers of normal organs sacrificed. While this is true now with some surgeons who do pelvic work without the proper training, the general aim among gynecologists is to endeavor to save all healthy organs or parts of organs. This has become so much of a law that many patients who have had this conservative surgery done come back to the surgeon for a second operation because they have not been made well, and the operator is accordingly blamed. The question is, then, Have we not gone beyond the conservative line, and are not organs or parts of organs being left that should have been removed?

Those who began this so-called conservatism wrote very voluminously and won many laurels for themselves because it was the right turning point, the procession was ready for the halt, and the glory to these gentlemen was great as it should have been. So rabid were gynecologists to do surgery that there was nearly a wholesale wiping out of gynecological therapeutics. The pessary, bushels of which were found in the specialist's office, was rarely thought of, and the tampon thought to be the implement of the ignorant. We have now a number of textbooks labeled, "Medical Gynecology," popular with the general practitioner and to be studied carefully by the specialist, who after all must be a surgeon. The first organs to be carefully studied were the ovaries; looking over the records of hospitals one sees numbers of operations done for cystic or cirrhotic ovaries which organs had been removed.

The first conservative surgeon punctured cysts of the ovaries, letting out the serum; then the cysts were curetted out, and sometimes some drug, as iodin swabbed about in the cavity.

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*Read before the Washington Obstetrical and Gynecological Society, March 19, 1909.

This was eventually found too conservative and the unhealthy part of the organ was cut away, usually by a wedge-shaped piece being excised, resection of the ovary. The remains of the ovary were then stitched over with silk or catgut. Healthy parts of the tubes were also left, the fimbriæ being removed the tube split and stitched back upon itself hoping some stray ovum from this piece of ovary would fall into this small piece of badly wounded tube. If we may believe the literature, the pieces of tube returned to the surgeon earlier than the pieces of ovaries. Or a piece of ovary was left on one side and a tube on the other with the expectation that an ovum from the bit of ovary would travel across the pelvis and find its way into the tube of the opposite side. Nor were these patients and surgeons always doomed to disappointment, for pregnancy in such cases has been reported.

In recent times a surgeon doing a trachelorrhaphy found excuse to remove the whole uterus; and for many causes this organ was needlessly sacrificed. Libraries are now full of literature written about the value of leaving the cervix or other parts of the uterus, while equally voluminous are the words of those who claim the whole organ should be removed, as being of no use when it is no longer capable of performing its function of child-bearing. Others claim that a part of the fundus uteri can be removed and still the patient become a mother.

Myomectomy was written about in a vainglorious way. It would almost seem that no uterus was so full of fibroids that it could not be rid of them and become a useful organ. Those who thought otherwise were very benighted.

Soon after the time of extreme radicalism some young woman came back to the surgeon hoping that she might, after the removal of her ovary be again put in a condition to menstruate and to bear children. A few rather progressive surgeons implanted into such a woman sections of healthy ovaries taken from another patient. The results were not at all brilliant.

It has been my custom for some years past to save organs or parts of organs thought to be healthy, or if the patient was young and very much desired children to take chances and leave parts of ovaries that under ordinary circumstances would be removed. This latter I think is always possible even if a second operation proves desirable later.

A general practitioner of this city who follows up his cases carefully says he always has trouble with those patients in whom a part of an ovary has been left. He says they come back and bother him until another operation is done, claiming they have not been cured by the original operation. But when both organs are diseased and removed, except for the symptoms of the menopause, he finds his patients well.

When operating for him he insists that no piece of ovary be left, however healthy it may appear, claiming that no patient in whom any piece had been left was well of her symptoms. The general practitioner knows his patient more intimately than the surgeon, and his observations should count for much. During the past six or seven years I have performed over one hundred laparotomies for this man.

We all agree that the operation is done for benefit of the patient, and if she has not been benefited or made well, the operation has been a failure, however radical or however conservative the surgery may have been. We must not be too radical in removing organs, for we cannot put them back even if we might find some other patient to furnish them. However, we must not let foolish ideas of so-called conservatism balk us in our duty toward the patient.

My observation has been that frequently when parts of cystic ovaries have been removed that the irritation of an already diseased organ, by the cutting and sewing, causes the diseases that already exist to develop more rapidly, and shortly the mutilated ovary is larger and more painful than originally. I have seen this in so many cases that I have concluded that if a badly cystic ovary exists with the usual symptoms, in which we would be tempted to resect, this ovary should be removed entire, or if the patient is young or greatly desires children or for some peculiar reasons of her own, some or all of the ovary must be left, that all of the ovary should be left. I believe that the woman is much better with a whole diseased and cystic ovary than with a part of such an organ. The same holds true with a cystic ovary into which cysts hemorrhage has taken place, so-called hematoma of the ovary. I have seen very little tissue in this condition that had at all the appearance of health. All of mine have returned with much more agravated symptoms than those of the menopause.

One or both ovaries are left after hysterectomy for fibroids, the claim being made that the patient does not have such violent symptoms of the menopause. The authorities say that usually the ovaries left after the uterus is removed undergo atrophy in about three years, though some cases are recorded of a longer time elapsing. My experience is that while the unpleasant symptoms may not be so violent, they set in equally as early and last almost indefinitely, certainly until some time after atrophy of the ovary. The question naturally arises, is it better to have a short and, it may be, a stormy menopause, or a long drawn-out and milder one? Is it humane to cut off a dog's tail one inch a week.

Dr. Chadwick says that none of his hysterectomy patients in whom an ovary was left have ceased to have disagreeable symptoms incident to the menopause.

H. A. Kelly says the functions conserved by conservatism are:

1. Maternity.
2. Menstruation.
3. Internal secretion.
4. Sexual instinct.

Kelly again says, "I might state the various conservative operations in gynecology at present recognized categorically as follows:

1. Substitution of myomectomy for hysterectomy in suitable cases.
2. Saving ovaries containing large Graafian cysts.
3. Saving ovaries containing large corpus luteum cysts.
4. Saving an ovary containing hematomata or a small fibroid.
5. Saving the ovary on the side of an extrauterine pregnancy, in many instances.
6. Saving a sound ovary on one side, with a sound tube on the opposite side.
7. The suspension of a displaced ovary, instead of its removal.
8. The liberation of an adherent tube and ovaries, provided the adhesions are not too dense and the organs have not suffered too greatly.
9. The draining of a pelvic abscess by vagina.
10. The draining of the hematocele of an extrauterine pregnancy by the vagina, when it is not in active growth."

In all of which I agree except in hematomata, when the condition of the part to be left should be very carefully considered.

This brings us back to the knowledge and experience of the operator. How many of us are able to say at the time of operation if all of a certain organ is diseased

FERNAND HENROTIN.—At least 30 per cent. of patients upon whom he had operated conservatively on the tubes and ovaries remained partially unwell or a good many of them were fully as bad as before.—AMER. JOUR. OBST., 91, 1906.

RUBEN PETERSON.—He had taken out more ovaries than he had left in after the removal of fibroids, but from a careful showing of his cases he could not see that the women were any better off, either symptomatically or in any other way, when he left in one of the ovaries or both ovaries after hysterectomy for fibroids and after taking them out.—AMER. JOUR. OBST., 93, 1906.

BANDLER.—It is generally conceded that after hysterectomy the annoying symptoms of the climacterum are absent if the ovaries be left behind. This view is an erroneous one. The ovaries generally atrophy and the function disappears at various periods, generally at the end of the second or third year. Quoting Pfister, "the influence which the female ovary exerts on the female organism is much overrated."—AMER. JOUR. OBST., 536, 1906.

VAN DE WARKER.—I have yet to see a woman made better in health by the removal of her ovaries.—AMER. JOUR. OBST., 371, 1906.

SETH C. GORDON.—The so-called conservative gynecology in too many cases was but a conservation of diseased organs in whole or in part, and not conservative of the health of the patient.—AMER. JOUR. OBST., 86, 1906.

DR. RUFUS HALL.—If the patient has been the subject of gonorrheal infection and a tube or ovary was left, sooner or later she would come back for the purpose of having either removed.—AMER. JOUR. OBST., 664, 1905.

DR. HYDE.—"I believe that a patient is a great deal better off after complete removal of the badly cystic ovaries, unless for reasons of her own she wishes an ovary left."—AMER. JOUR. OBST., 290, 1905.

J. MONTGOMERY BALDY says it was difficult to tell what was and what was not disease in the ovary, and in a very large number of instances it was necessary to decide the question by the symptoms and not by the make-up of the organ.—AMER. JOUR. OBST., 87, 1906.

CASE I.—Mrs. W. Patient of Dr. Chadwick. White. Æt. thirty-two. Married. No children. Suffers severe pelvic pain, great dysmenorrhea. Operation at Sibley Hospital, September

21, 1905. Right ovary cystic, removed with its tube. Left ovary cystic, resected. Patient not improved, had the same pain as before operation. Operated upon again April 19, 1908, at Garfield. Part of ovary three times normal size. Patient was immediately relieved of her disagreeable symptoms.

Case II.—Mrs. H. Referred by Dr. Chadwick. White. Children. Pelvic pain and dysmenorrhea. Operated upon April 1905, at Sibley Hospital. Both ovaries cystic. Right ovary and tube removed. Left ovary resected. Appendix removed. Patient not made better. Dysmenorrhea is greater and patient is a chronic invalid.

Case III.—Mrs. V. Referred by Dr. Chadwick. Pelvic pain and dysmenorrhea. Operated upon September 5, 1905, at Sibley Hospital. Both ovaries cystic. Right ovary and tube removed. Left ovary resected. Appendix removed. No improvement after operation. Examination January, 1907, showed mass size of small lemon on left.

Case IV.—Mrs. I. Referred by Dr. Chadwick. Pelvic pain and dysmenorrhea. Operated upon at Sibley, May, 1904. Both ovaries cystic. Right ovary tube removed. Left ovary resected. Patient not better until two years after when the piece of ovary appears to have atrophied and the menopause occurred, she was well of her pain.

Case V.—Mrs. S. White. Æt. thirty-three. No children. Referred by Dr. Wynkoop. Suffered from pelvic pain and dysmenorrhea. Masses felt in both sides. Operation at Sibley Hospital. Both ovaries enlarged to size of lemon and contained blood. On section, the ovary was found to be cystic, the flood filling the cysts. One ovary and tube was removed and all the ovarian tissue in the other that looked normal was left. Patient improved. Reentered Sibley Hospital. The remains of the ovary were again enlarged and cystic, containing disintegrated blood. Patient has been well since.

Case VI.—Miss Meek. White. Æt. twenty-four. Referred by Dr. Chadwick. Gonorrheal infection of left tube and ovary. Right apparently normal. Operated on at Sibley Hospital, 1906. Left tube and ovary removed. Operated upon again after three months. The other tube and ovary contained pus; both removed.

Case VII.—Miss G. White. Æt. twenty-eight. Has men struated regularly since fourteen years of age. Four years ago began to suffer with dysmenorrhea which gradually became worse. Has had all kinds of treatment, including osteopathy, electricity, and Christian Science.

Patient came to my office December, 1908. Examination showed large masses on both sides. Operated upon January, 1909, at the Providence Hospital. Both ovaries, about the size of small lemons, contained broken-down blood-clots, and were evidently cystic before the extravasation of blood. Left ovary was removed and the right was cut away, leaving all the tissue that looked at all normal. Patient still menstruates, but is not relieved of symptoms. The patient was about to marry and desired very much that the ovaries should not be removed. Unless the small bit left should atrophy I believe she will not be well.

CASE VIII.—Miss C. White. Æt. thirty-one. Operated upon at Providence Hospital, four years ago, for pelvic pain. One ovary removed and the other resected. Symptoms were unimproved. Operated upon again January, 1909. Ovary about size of hen's egg, cystic, very greatly diseased.

CASE IX. Miss H. White. Æt. twenty-six. Fibroid of uterus with pregnancy. Operated at Garfield Hospital, 1906. Supravaginal hysterectomy. One ovary left. After eight years she claimed she had suffered and still suffers with the disagreeable tortures of menopause. Sexual instinct was unimpaired.

CASE X.—Mrs. R. White. Æt. thirty-four. Two children. She was operated upon three years ago by another surgeon for fibroids, a myomectomy being done. She said nine small tumors, the whole of which would fill a quart cup, were removed. After she had gone home she returned to the hospital and had a submucous fibroid taken out. She came to my office September, 1908, with great pelvic pain and hemorrhage. A tumor filling the pelvis, densely adherent, was found. She entered Providence Hospital, where I did a panhysterectomy. The operation was made very difficult by the adhesions over the place from which the small fibroids were taken.

1312 FIFTEENTH STREET.

PUBIOTOMY.*

AN OPERATION FOR THE GENERAL PRACTITIONER.

BY
CHARLES B. REED, M. D.,
Chicago, Ill.

INTO the hands of the general practitioner all obstetrical complications fall, so even a small practice will sooner or later present problems and emergencies which tax the skill and ingenuity of the most expert, and yet must be met and solved as best they may by an attendant who may have neither adequate equipment nor unusual experience upon which to rely.

An operation which promises to be a help to the profession under such conditions and in such emergencies demands our earnest attention.

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*Read before the Chicago Gynecological Society, March 10, 1909.

This promise, in my opinion, is extended by pubiotomy, an operation which is not reserved for the specialist only and whose performance is not restricted to hospitals.

It is the purpose of this paper to call attention to some of the reasons which support this proposition, for since the operation is not in general use, it will not at first receive universal acceptance.

The operation applies naturally to only one class of obstetrical difficulties, namely, pelvic contraction and its associated evils in labor, yet as contraction of the pelvis to a serious degree is met in one out of every twenty cases, the indication is an important one.

Furthermore, in this 5 per cent. of all cases it is recognized that the generally contracted and the flat pelvis occur with the greatest frequency, constituting not less than 75 per cent. of the bony obstacles that may complicate labor. While not limited entirely to this field, yet the operation of pubiotomy is most useful in these cases of pelvic contraction.

To briefly call attention to some of the evil results of such contraction: incorrect positions of the child are at least four times as frequent as in normal pelves, and these abnormal positions, while very common in primipara, increase in frequency in direct proportion to the number of labors. We very commonly find transverse positions as well as presentations of face and feet and associated therewith unusual uterine mobility and pendulous abdomen.

In labor, prolapse of the cord and pariteal bone positions readily occur. The labor is much prolonged, the membranes rupture early and infection frequently follows. Locally the results may be very serious. The pains may become very powerful, and failing to overcome the difficulty, the uterus is ruptured. A very suggestive injury may happen when the head is forced through the pelvic ring with such force that it ruptures a joint, usually the symphysis. The prolonged pressure of the head against the pelvic brim may cause necrosis of the intervening mucous membrane with resultant fistula.

Tympania uteri may precede, accompany, or follow a local or general infection. To these evils must be added the consequences of operative interference which are not always to be avoided even by the most skillful.

Besides injuries to the mother, those to the child must be considered. The least important are scalp wounds caused by the advance and rotation of the head. Then come the spoon-shaped depressions, which are followed by the death of the child in 66 per cent. of the cases reported. Fractures of the skull or vertebra in the delivery, together with hemorrhages into the brain are not uncommon. The severe pains make the exchange of gases in the placenta difficult and the child may be asphyxiated. Owing to the strong pains, partial or complete detachment of the placenta may occur, followed by the death of the child. Fractures of the clavicle or humerus during manual extraction and Erb's paralysis must also be mentioned.

In a typical case the history is somewhat as follows:

The patient regards labor as a physiological function and calls for the doctor only when the pains begin. The labor is long and painful, the woman exhausts her strength and vitality, and becomes a fit subject for germ invasion. At length a crisis arrives, forceps are repeatedly tried and always in vain.

If the head is still high up, version may be tried and possibly may succeed in delivering a dead child, but usually help is sent for, the woman being in a condition where immediate delivery is imperative.

Cesarean section under such conditions usually results in the death of both mother and child, hence in behalf of the mother craniotomy is done, and after a long and anxious puerperium the mother may survive.

Assuming the patient to be a primipara, her second pregnancy is awaited in terror by herself and her husband, and justly with anxiety and dread by her physician who realizes how uncertain are her chances of securing a living child.

The available resources of the physician are:

(*a*) Prochownick diet during the last six weeks of pregnancy in the hope of securing a small-sized child.

(*b*) Induction of premature labor at the thirty-fourth week, or near that time.

(*c*) Axis-traction forceps at term.

(*d*) Version and extraction at term.

(*e*) Cesarean section as an operation of election at term.

(*f*) Pubiotomy at term, either alone or in association with forceps or version as the condition seems to demand.

The method to be chosen depends upon the degree of contraction as revealed by careful measurements. In many cases of moderate contraction, say with a conjugata vera of 9 cm. or more, we can secure a marked diminution in the size of the child, and frequently obtain a living child after a relatively easy labor by means of the Prochownick diet.

In cases of very marked pelvic contraction Cesarean section can alone be considered.

Between the extremes, however, will be found the great majority of cases in which delivery has been attempted previously by induction of premature labor, by forceps, or by version and extraction.

In relation to these methods it may not be amiss to quote a few figures, and from these we may learn why another operation such as pubiotomy has been deemed necessary.

The mortality for the child in cases of the generally contracted or flat pelvis where labor terminates without interference is given by V. Winckel at 20 per cent., or one in five. In labors artificially terminated we find a mortality for the child from version and extraction of from 35 to 60 per cent. From forceps 35 to 60 per cent. From premature labor 30 per cent. or more of the children die during the delivery or shortly thereafter.

Each of these methods, however, has its ardent advocates who defend their choice with enthusiasm and much real reason. But no logic, no reason, no scientifically developed theories are of much avail when brought into comparison with figures taken from the best clinics in the world during the antiseptic era.

The fact remains that whatever method is accepted, the chances are that from one in three to two in three of your babes are lost, aside from maternal injuries.

Neither reason or logic can be largely consoling to the parents who have lost their offspring and even the hope thereof, nor to the physician who has fought with fate, conservatively, calmly and judiciously, against mechanical obstacles which are inertly superior to his best skill.

Crushed by these results, appalled by such a percentage of apparently unavoidable fetal fatalities, operator after operator has made experimental excursions into other surgical fields in the hope of finding a way of diminishing this mortality. Cesarean section for relative indications was one, and symphysiotomy another result of such endeavors.

The first has done yeoman service and cannot be overlooked, but owing to the serious after effects and the dangers inherent to the operation, as well as the difficulties and dangers attending its performance outside of hospitals, symphysiotomy has had its day and in my opinion will be entirely supplanted by pubiotomy.

The operation called pubiotomy, hebotomy, or hebosteotomy consists in the division of the pubic bone to the right or left of the symphysis, and although first performed by Van de Velde it was not taken up until 1898 when Gigli and Bernardi began to publish their reports.

The technic of the operation is simple:

The so-called subcutaneous method consists merely in the introduction of a large curved eyed needle, called the Doederlein needle, through a very small puncture in the skin, down in the pubic bone about two fingers' breadth to the right or left of the symphysis, thence hugging the posterior wall of the bone, or even subperiosteally, the needle is advanced until it is brought out beneath the lower edge of the bone outside the greater lip. (The needle may be introduced and passed from below upward.)

The needle carries down with it, or has its eye threaded after it appears with a silk suture which in turn draws up or down a Gigli wire saw with which the bone is severed.

Another method is rather simpler: An incision is made down to the pubic bone about two fingers' breadth to the right or left of the symphysis, a corresponding incision is made underneath the ramus of the ischium at a point so situated that the saw will not enter the obturator foramen, then the saw is passed through an opening made for it by blunt dissection from above and under the guidance of the finger which may be introduced into the lower incision under the ramus.

This method is still further simplified by the use of a Seeligmann hollow needle which carries the Gigli saw down with it and acts as a guard while the saw is in action.

Several variations of technic have been advised, but none of them possesses any distinct advantage over the above when carefully executed. The only instruments which are really essential are a scalpel, a dressing forceps with pronounced curve and a Gigli wire saw.

There are certain dangers in the performance of the operation which must be recognized and avoided.

Some care must be exercised to avoid the bladder and urethra. This is most easily accomplished by the open method, or under the guardianship of the Seeligmann hollow needle; when the saw is carried two fingers' breadth to the outside of the symphysis the urethra can hardly be considered as a danger. Too great separation of the bones is prevented by the pelvic muscles. The bone should not be severed so far from the symphysis that the foramen is entered, for in this way one does not get the desired separation. Hemorrhage when it occurs is quickly controlled by pressure or packing. Sepsis may occur, but no more probably than in any other case where labor is interfered with; this is a personal matter and the responsibility rests upon the operator, and not upon the operation. Since the peritoneum is not invaded it is not improbable that the operation can be done ultimately in septic cases.

Hematoma and edema of the vulva may occur, but are not usually serious. Laceration of the soft parts, especially of the bladder and vagina may also occur when the head is delivered and are usually due to a too rapid delivery. They will occur less often if the woman is allowed to be delivered spontaneously, but when they do occur, they must be treated like other lacerations of the birth canal which accompany labor. These injuries may be avoided many times by doing an episiotomy on the side to which the occiput lies. The woman is not kept in bed longer than two or three weeks, no sutures are required, no binder and no especial aftercare is demanded. So far as I can find, no permanent sequelæ have been reported for which the operation *per se* was responsible, the woman walks and does her work just as before, although rarely a little pain is felt for a short time.

What is the aim of the operation, or having done the operation what is thereby accomplished? Primarily with a separation of 3 cm. between the ends of the bones there is an enlargement of the pelvis in all its diameters of about 1 cm. (Van Cauvenberghe).

This will permit the woman to deliver herself of her babe in most instances without further interference, but if interference is required in behalf of mother or babe, it may be undertaken in what is now a fine roomy pelvis through which either forceps or version is likely to bring a living child.

Lichtenstein reports a series of 154 cases of version and extraction in which 110 were done before pubiotomy with a mortality of 32.82 per cent., while forty-four done after pubiotomy gave a mortality of only 13.64 per cent.

The ideal method, of course, and especially when called to the patient for the first time when she is in labor, is to watch the case with the utmost care until it is apparent that the head will not engage, and then in place of the usual operation of forceps or the more correct operation of version do pubiotomy, after which the mother should be allowed to deliver spontaneously unless there are indications of danger to mother or babe.

A further advantage lies in the fact that the bones are closed by a fibrous union which frequently leaves the pelvis larger than before in all diameters and ultimately ossifies in this condition so that a subsequent labor may be normal. This permanent increase may amount to as much as 1.5 cm. in the diagonal conjugate, but may be as small as 0.25 cm. (Bell et al.).

To secure this advantage in some instances a so-called prophylactic pubiotomy is done at the seventh month to prepare the pelvis for a normal delivery at term.

We have already mentioned that the field for this operation lies among those pelves which present a conjugate of less than 9 1/2 cm. and more than 7 cm. Beyond these limits other operations must be considered.

In addition to pelvic contraction, the operation may be advisable in cases of impacted head *in a normal pelvis*, where the face presents, or where chin or occiput is directly posterior. To get a more comprehensive idea of the character of this operation let us compare it with the common forceps operation which will be advocated by many as the safer operation for general use.

Infection is an admitted danger in pubiotomy, but no more so, surely, than with forceps which it so frequently follows. It may be urged that hemorrhage should be feared, which is mildly true and so it should also be from forceps more so than is usually the case.

It is feared the operation may be undertaken by the incompetent—so is the forceps operation only too often. The operation may be undertaken too frequently or when not indicated—merely as an aid to quick labor. This is certainly true of forceps, and yet we do not hear the operation blamed for that, but rather the operator. The technic is extremely simple, much easier to understand and acquire than the forceps technic.

It may be done unskillfully—so may be the forceps operation. My contention is this: The operation must be employed judiciously and not abused. The young graduate of our schools at the present time is well trained in surgical cleanliness, and even without such training the liability to infection is no greater than with forceps since the lochia does not pass over the wound and drainage is downward and good. The operation with the

Seligman needle is advocated for general use because it is easy of execution, it drains easier, and the septic material is not closed up in a limited space.

To recapitulate, I would say that the operation recommends itself to the general practitioner because:

1. It is a desirable method of securing the delivery of 75 per cent. of his contracted pelvis cases, with best results for mother and child.
2. The cases of difficult version and extraction and difficult forceps will be reduced to a minimum, or if done will be done under the most favorable conditions.
3. The technic of the operation is simple and easily acquired.
4. The dangers are few and mostly to be avoided by anyone with moderate surgical training and conscience.
5. The operation can be done in a very few minutes.
6. The labor is made easier and the chances for a living child are greatly improved.
7. It can be done in the home of the patient.
8. Only a very small armamentarium is required.
9. In many cases the pelvis is permanently enlarged, so that a subsequent labor may be normal.

In conclusion it may be stated as a prediction, that while the forceps operation has required a hundred and fifty years in which to become so common that its abuse is frequently spoken of, it is reasonable, in my opinion, to say that the same accusation will be available against pubiotomy in less than fifty years, for the same reason, namely, the great frequency of its performance.

It is the sincere belief of the writer that the operation for the reasons given has a great future and that its future rests not with the specialist, but in the hands of the general practitioner.

Admitting the danger of infection and hemorrhage together with possible laceration of vagina and urethra.

Admitting that the wound is essentially a compound fracture, although without the usual bruising and devitalization of the soft parts.

Admitting that the mortality for the child is greater than in elective Cesarean section, or even admitting that the operation may be improperly done, or too frequently employed.

Admitting that it may be done unnecessarily as a means of expediting labor as forceps are now used or that it may be attempted in cases for which it is not adapted.

Nevertheless it is my opinion that as soon as the technic is more generally understood, the operation will become justly popular among all who have themselves participated in, or who have ever witnessed one of those terrific struggles in which the doctor strives with all the strength and skill at his command to deliver a child by forceps or version through a pelvis either relatively or actually too small.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of April 13, 1909.

The Vice-President, WILLIAM S. STONE, M. D., *in the Chair.*

TWO CASES OF SUSPECTED TUBAL PREGNANCY,

DR. C. G. CHILD reported and presented one specimen.

In operating upon supposed cases of tubal pregnancy we are sometimes disappointed because the microscopical examination does not prove the original diagnosis, even where at the time of the operation all classical symptoms and findings of tubal pregnancy were present, and it is with the idea of getting the opinions of the members of the Obstetrical Society and of our guests this evening as to what should be the classification of these cases that I report two cases this evening. In the first case I am unable to show you the specimen because it is still in the process of preparation, so I will read you briefly the histories.

CASE I.—Mrs. K., age twenty-eight. One child by normal labor eight years ago.

Menstruation began at thirteen years, irregular, seven days' duration, profuse, no pain. Last menstruation in February. On March 13, while attempting to lift a small trunk from the closet shelf she fell on her back, the trunk striking her in the left lower portion of the abdomen. This accident was followed immediately by severe pain in the pelvis and a feeling of faintness. The patient was put to bed and there remained until I first saw her two weeks later. She then showed a large soft tumor posterior to the uterus and extending up out of the pelvis to the umbilicus. At the upper part of the left inguinal canal was an omentocele the size of an egg, exceedingly tender, which had not been present previous to the injury.

Temperature 102, pulse 120, respirations 38. No leukocytosis. Marked secondary anemia.

Operation April 3. Pfannenstiel incision; large quantity of fluid and clotted blood found in the pelvis in which the pelvic organs were buried. The right tube chronic salpingitis; the left tube was slightly enlarged in its middle third with a longitudinal tear one and a half inches long, through which protruded a well-organized blood-clot.

A portion of the omentum was adherent in the inguinal canal, and when removed appeared necrotic.

CASE II.—Mrs. B., age thirty-six. Married eighteen years. First menstruation at nineteen years, regular, four days duration, with pain on first day. Last menstruation six weeks ago. Operation for ruptured right tubal pregnancy two years ago, since which time her menstruation has been regular every twenty-eight days. On December 14, when two weeks overdue, she began to have pain in the region of the left tube, and a few days later a slight spotting appeared. At this time the tube was slightly enlarged and tender. The spotting and pain, with progressive enlargement of the tube, continued, accompanied by slight morning nausea.

Diagnosis.—Left tubal pregnancy.

Operation Jan. 22. Abdominal celiotomy; removal of slightly adherent, enlarged left tube containing fluid and clotted blood.

The second case was also sent to the pathologist for the microscopical evidences of pregnancy which, however, he could not find. Both of these cases came to my attention within a few months. The clinical symptoms were those of tubal pregnancy, and yet the microscopical findings were negative. The second specimen was a clear case apparently of hemorrhage in the tube. The first case had extensive hemorrhage after rupture of the tube. I searched as carefully as I could for ruptured vessels in the broad ligament and was unable to find them. She had, of course, a history of severe traumatism and it might possibly be a rupture of an old chronic salpingitis, although the tube did not have that appearance. It was the softened tube which one expects to find in a case of tubal pregnancy. I would like to get the opinion of the Society in regard to the classification of these cases.

DISCUSSION.

DR. BRETTAUER.—I am sure that if in every case of hemorrhage from a tube which is operated upon for tubal pregnancy, a microscopical examination was made, we would find these cases much more frequent than are now reported. I remember that in this Society some have reported such cases. I think there are some other reasons for them etiologically. I have personally seen two cases. I cannot verify them by the specimen because I only did a vaginal section and did not remove the tubes. I was sure we had to deal with a tubal pregnancy upon opening the culdesac and seeing the free blood in the pelvis, but looking at both tubes we were satisfied that we had not to deal with a tubal pregnancy as a possible cause for the hemorrhage, as the tubes were empty in both cases.

DR. GOFFE.—I thank the doctor for bringing these cases so strikingly before us. It has been my custom to regard all these cases as having their origin in gestation, and I think we all have been accustomed to put them down as ectopic pregnancy. The question is just how far must we depend on the pathologist. Is that the final court, or may he or the laboratory be at fault? We know at the present time that a great many questions that formerly rested entirely upon the findings of the pathologist we have taken into our own hands and settled clinically.

I infer from Dr. Brettauer's remarks that he believes in these cases of hematosalpinx hemorrhage is occasioned by many other causes than tubal pregnancy. I do not know what we must take for the final judgment. Are we to depend entirely upon the report of the pathologist? If he finds evidence of gestation then it will be ectopic pregnancy; if he reports negative results we must put it down as hematocele or hematosalpinx due to traumatism. We know that pathologists are sometimes careless as well as every other class of men. For myself I am inclined to let the clinical evidence weigh pretty heavily in the balance where I find the report of the pathologist at variance. I prefer to know my pathologist, to know the character of the man before I take his opinion when it clashes with my clinical opinion.

Dr. Vineberg.—The last speaker has recalled vividly a case I had two or three years ago in which the clinical evidences were very strong in favor of intrauterine pregnancy. I have already reported the case. The woman went into collapse with a very profound hemorrhage. I opened the abdomen and found and removed a ruptured tube. It was sent to the pathologist at Mt. Sinai and his report was that there was no pregnancy in the tube. I differed with him, and said I did not think it was possible to have that amount of hemorrhage from any other cause. He made further sections of the tube and then reported a different finding, stating that it was an ectopic rupture of the tube.

It seems to me that in most cases where you have hematosalpinx it is pretty easily, as a rule, determined, for thee nd of the tube is closed and usually club-shaped in these cases even where you get a good-sized rupture of the tube. I have seen a good many such cases. I do not recall any case I have operated on in which there was any doubt of ectopic pregnancy. I have removed tubes that contained clot, but there was no difficulty in the diagnosis.

Dr. Studdiford.—I would like to ask what the findings of the pathologist were in the cases Dr. Child has reported.

Dr. Waldo.—Two or three years ago I had two cases, one following quite close to the other. There were quite large accumulations of blood in the tubes which were removed by abdominal section. Very careful microscopical examinations were made and the pathologist was thoroughly convinced that these accumulations of blood were not due to pregnancy. I presented these two cases at the obstetrical section of the Academy of Medicine and also carried a number of slides and presented them at the time. I presented them under the term hematosalpinx. I used the term simply because so frequently the condition is supposed to be due only to pregnancy in the tube, but I am thoroughly convinced in these two instances that was not the case. There was no intraperitoneal blood in these cases.

DR. BROUN.—I have never had an experience similar to those Dr. Child reports, but it occurs to me in seeing this specimen that it is possible the evidences of tubal pregnancy are still there but have not been discovered because of the effort on the part of the pathologist to preserve the specimen. I know frequently there is failure because of effort to preserve the specimen and not cutting it up for careful examination.

DR. STONE.—There is one point which it is very necessary to bring out from the pathologist's standpoint. Anyone who has made sections of these pregnancies knows how quickly the blood-clot destroys the tissues. Indeed, both of these cases of Dr. Child had considerable hemorrhage, and chorionic villi are especially difficult in many cases to recognize even when, from the presence of the fetus, we know it to be a pregnancy.

DR. CHILD.—In answer to Dr. Vineberg's question, the end of the tube in both cases was perfectly free. In the second case the tube, which was intact, showed the typical enlargement of pregnancy in the middle third.

Answering Dr. Broun's and Dr. Studdiford's questions, the tube was sectioned after it was prepared, and the pathologist told me he took numerous sections of it, enough to satisfy him. This case had all the symptoms of tubal pregnancy. I had watched her through her first ruptured pregnancy, and saw her sixteen months later with the same condition in the left tube, and as the clinical picture was so typical of tubal pregnancy I was very much surprised that the pathologist did not confirm my diagnosis. This specimen appears here more or less as a blood-clot at the opening of the tube, but when opened at time of operation it was apparantly a perfect ovum.

DR. H. GRAD presented the report of a case of

SUBACUTE APPENDICITIS AND TUBAL GESTATION ON THE RIGHT SIDE.

In spite of great vigilance exercised in diagnosticating ectopic gestation and suspecting tubal pregnancy in all cases with manifestations of disturbed menstrual function, as well as in persistent metrorrhagias, cases will come under observations where no diagnosis will be made, and the abdomen be opened without suspecting the condition. The following is an illustrative case, and is reported because of the associated appendicitis and right Fallopian tube gestation.

Mrs. D., age thirty-two, applied for admission to the hospital on March 8, 1909. She is a short stout woman with a prominent abdomen; has been married four years, and has two children, the last child being born three months ago.

She complains of pain in the right lower quadrant of the abdomen. The point of greatest sensitiveness is one inch above McBurney's point. This pain has become quite severe for the past few days. She has had pain in this region of her abdomen all through her pregnancy. There is a slight but well-defined rigidity of the right rectus muscle. Temperature and pulse normal. Heart and lungs negative.

Her labor was uncomplicated, but she has been flowing ever since her confinement. At times there is only spotting, but at other times the flow is apt to be considerable in quantity. She did not nurse her baby.

Bimanual examination showed the cervix uteri to be in proper plane and position, slightly lacerated, Douglas' culdesac free, no bulging masses found laterally; no pain or pressure anywhere in the pelvis.

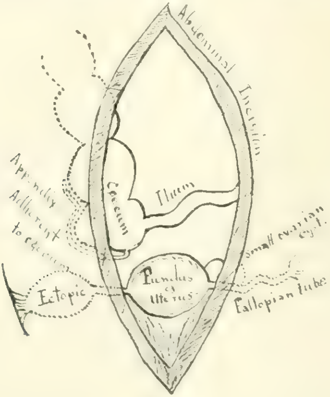

FIG. 1.

On account of the obese condition of the patient, the fundus of the uterus could not be palpated satisfactorily, nor could the adnexa be mapped out. Rectal examination was negative. The perineum is lacerated to the second degree. Sound introduced into the uterus takes the normal course.

A diagnosis was made of subacute appendicitis, postpuerperal endometritis, laceration of the cervix and perineum, and preparations made for operation next day.

Under ether narcosis, a bimanual examination showed the uterus in position, movable and with a small ill-defined mass on either side.

The uterus was curetted and an application of 30 per cent. of argyrol made. The laceration of the perineum was repaired by the flap-splitting method. On opening the abdomen through a median incision, a large quantity of free fresh blood was found in the peritoneal cavity. At first I thought I had accidently punctured the uterus while divulsing and curetting the organ. The uterus was at once grasped and brought into view. It was then found that instead of a punctured uterus I had to deal with a bleeding ectopic gestation on the right side. The right tube was enlarged, the seat of a hematoma, there was no rupture in its walls, and the bleeding took place through the fimbriated opening. The gravid tube was clamped off, removed, and the broad ligament sutured. A small ovarian cyst was found on the left side which was removed. After mopping out the blood from the peritoneal cavity and carefully inspecting the pelvis, an organized clot was found adherent to the peritoneum on the right side about an inch from the edge of the right broad ligament which undoubtedly was the point where the gravid tube became adherent. During the curettege, the gravid tube tore away from its peritoneal attachment, giving rise to the blood found on opening the abdomen.

The appendix was searched for and found adherent to the ascending colon along its right border for about six inches, as shown in the diagram. The appendix was liberated from its adherent bed with considerable difficulty and its mesoappendix sutured under adverse condition on account of its deep position in the abdomen and inaccessibility. The patient made an uninterrupted recovery.

The case is of interest because of the difficulty of diagnosis, the associated conditions of appendicitis and ectopic gestation, and the fact that the patient was confined only three months previously. If no appendicitis had been present in this case and there had been no reason for opening the abdomen, the intraabdominal hemorrhage following the curettage would have been diagnosticated as due to rupture of the uterus. The case illustrates the difficulties of diagnosis of intraabdominal conditions, and that even simple operations like a curettage should not be undertaken lightly, but should be done with proper surroundings and with due care and attention.

The study of this case also demonstrates that a pregnancy in the Fallopian tube may be an etiological factor in metrorrhagias following the puerperium. Many and varied are the pathologic possibilities of the intraabdominal organs.

DISCUSSION.

Dr. Goffe.—I would like to ask what the evidences were of an ectopic pregnancy.

Dr. Grad.—The pathologist reported chorionic villi.

Dr. Hofmeier discussed the case in German.

Dr. Boldt.—Professor Hofmeier wishes to say that he agrees with Dr. Vineberg; if the abdominal ends of the tube are open he would consider them cases of tubal gestation. It is extremely difficult in cases of long standing where the chorionic villi have been destroyed by blood to find evidence of ectopic gestation unless serial sections of the whole tube are made. He believes that in nearly all these instances we are dealing with ectopic gestation.

Dr. F. J. Boldt presented a

MYOFIBROMATOUS UTERUS.

C. W., aged thirty-five years; never pregnant, was referred to me by Dr. Carlton Simon. The patient asserts that she has had her abdomen opened five times for the purpose of having a tumor extirpated, but that the surgeon has always subsequently informed her that it was impossible to remove the tumor. The last time she went to Germany for this purpose with a similar result. The woman has such agonizing pain in her back and abdomen that she has become a morphine eater. She was once cured of the morphine habit, but the pain induced her to again resort to it.

The first time she was operated upon, she states the operating surgeon told her that he had removed a fibromyomatous uterus and both ovaries.

The lower abdomen was filled by a tumor which extended upward to the umbilicus and was most prominent a little to the left of the median line. It seemed to be a uterine tumor; the vaginal part of the cervix was crowded up behind the symphysis. Judging from the contour and consistency of the tumor, the diagnosis of a fibrocystic myoma of the uterus was made. The lower segment of the tumor was more solid in consistency than the larger part of the tumor, which was more cystic. It is evident from the result of the examination that there were extensive and very firm adhesions, it being impossible to move the tumor from its position. It was tightly wedged into the true pelvis. The patient's pains were readily explained by the position of the growth.

The operation on March 3 verified, at least from a macroscopical point of view, the diagnosis that had previously been made. The operation proved, technically, very difficult. In most places the intestinal adhesions were overcome by cutting through the capsule of the tumor, thus peeling it off with the intestinal ahesions. The entire lower segment of the tumor was retroperitoneal. On the right side the ureter was exposed for about four inches, and to control a profuse hemorrhage in the pelvis, a ligature was accidentally put around it. After the bleeding was controlled, the error was noticed and the ligature loosened. The hemorrhage in the right pelvic fossa was very profuse and had to be temporarily controlled by pressure with towels. The cervix was unusually long, and, because of not previously tamponing the vagina, gave considerable trouble to excise. The raw surfaces were all again covered with peritoneum before the abdomen was closed.

The pathologists report states:

"The specimen consists of the cervical portion of uterus surrounded by a large fibroid tumor and both ovaries. The tubes cannot be found. The cervix is considerably elongated. Its canal appears to pass into the uterine canal situated a few millimeters below the surface of the tumor. The tumor is covered in places by dense adhesions. It is irregularly rounded with a deep constriction near its center due to adhesions. Its surface is nodular and quite vascular. It measures in its greatest dimensions 20 x 17.5 x 12.5 cm. Its consistence varies considerably, in places being very hard and firm, in others soft and almost fluctuating. Between these are various degrees of hardness. On section the tumor appears to be a typical fibromyoma, which in places shows considerable edema. There is no evidence of malignancy in the gross. Ovaries shows no special change.

"Sections taken from various parts shows it to be made up of alternate bands of smooth muscle and connective tissue. Some areas show considerable edema with separation of the muscle and connective-tissue fibers. Other areas show hyaline degeneration. In places the tumor is quite vascular. No evidence of sarcomatous change. Ovary presents several Graafian follicular cysts."

DR. BOLDT also presented a

CARCINOMATOUS UTERUS REMOVED BY VAGINAL HYSTERECTOMY WITH INJURY OF BOTH URETERS; URETEROCYSTOSTOMY; DOUBLE PNEUMONIA; BURSTING OPEN OF ABDOMINAL WOUND; RECOVERY.

The uterus was extirpated per vaginam, and because of some technical difficulty a profuse hemorrhage resulted on either side; it was probably because of this that both ureters were injured. Some time later an abdominal ureterocystostomy was done with the aid of a trocar and cannula especially devised for such intervention. In theory the device is excellent, but I did not notice any particular advantage in practice. The method consists in perforating the bladder with the trocar at the point where it is intended to implant the ureter, then a long silk thread is passed through the terminal end of the ureter, which is threaded through the eye in the trocar; then the trocar is drawn into the cannula and out through the urethra. The thread which has been passed through the ureter being sufficiently long is drawn out through the urethral opening. The ureter is drawn into the bladder for the distance that it is purposed to implant it; then with the thread it is held in position until the bladder had been fastened to it with two or three stitches. Next, the thread is pulled out entirely. If one desires, a retention catheter may be put into the bladder. In this instance one was left in the bladder for two days.

On the second day the woman developed pneumonia, which soon spread so that by the fourth day she had a double lobar pneumonia. On the fifth day, as the result of much coughing, she burst open the entire abdominal wound, to such extent that the intestines had to be replaced. Despite of all these complications the woman recovered, and is now about ready to leave the hospital. The ureters are functionating satisfactorily.

The credit of the technic described for the ureterocystostomy, probably belongs to Mackenrodt, of Berlin. Dr. Aspell told me that he had seen this technic employed by Mackenrodt.

DISCUSSION.

Dr. Grad.—I can see a very great advantage in the instrument. I had to do an implantation some time ago, and found difficulty in opening the bladder. I used uterine forceps introduced through the urethra.

Dr. Brettauer reported a case of

ABDOMINAL HYSTERECTOMY FOR FIBROIDS, COMPLICATED BY CARCINOMA OF THE RECTUM; RESECTION; RECOVERY.

The specimen, the photograph of which you see, was removed from an unmarried woman, thirty-eight years of age, on January 9, last. The menstrual history was normal, the last period occurring on December 28. Two months previous to operation the patient experienced severe pain in the left iliac fossa, which has since recurred at frequent intervals, characterized at times by intense bearing down.

The attending physician, Dr. G. MacDonald, at his first examination recognized the presence of a fibroid uterus, one rather large nodule located in the left iliac fossa being held responsible for the symptoms. He observed the patient for two months and noticed a decided increase in the size of the tumor and obstinate constipation. He then referred her to me. I found the patient in very good general condition, rather deaf in both ears, with unequal pupils; chest organs normal, abdomen full and rounded, the course of the colon presenting a rather exaggerated tympany. There was a mass in the left iliac region the size of a child's head, distinctly palpable, arising from the pelvis with several smaller ones to the right of it. On account of the intact hymen, bimanual examination was rather unsatisfactory—vaginal as well as rectal. The fact could only be established that this mass was closely connected with the uterus, and that high up in the Douglas there was another mass, whose motility, however, could not be firmly established. Under narcosis, the mass in the left iliac region proved to be distinctly movable, and the symptoms were attributed to its pressure on the sigmoid. On opening the abdomen, a uterus containing multiple fibroids was immediately seen, and it was noticed that the mass previously felt in the Douglas had no connection whatever with the uterus.

A typical supravaginal amputation of the uterus was done. A thorough rectal examination revealed the fact that the tumor originally felt in the Douglas was a large carcinoma, extending over the upper rectum and lower sigmoid to the extent of nearly three inches. It was decided to at once add a resection of the diseased gut. The mesentery of the lower sigmoid was tied off in healthy tissue, the sigmoid temporarily ligated with strips of iodoform gauze, and then severed between them. There being no enlarged glands nor any inflammatory condition present, it was an easy matter to tie off the mesorectum down to about two inches from the anus. The diseased part was now removed between two ligatures. It needed very little freeing of the mesosigmoid to enable me to pull down the severed sigmoid end, guiding it through the remaining rectum until its cut edge passed the anus. The serous surface of the sigmoid was now attached by sutures to the upper slightly inverted edge of the rectum, the peritoneum united over both broad ligament stumps, and then two pieces of gauze were lightly put over the line of suture between the rectum and sigmoid, led out through the vagina, and the bladder now used to cover the whole anterior surface of the anastomosis, leaving practically every raw surface covered by peritoneum. After the abdominal incision was sutured in layers, the severed end of the sigmoid was attached to the mucocutaneous margin by four silk sutures, between which rubber tissue drains were placed, and a tampon cannula inserted The whole procedure lasting two and one-half hours was tolerated by the patient without any bad effects.

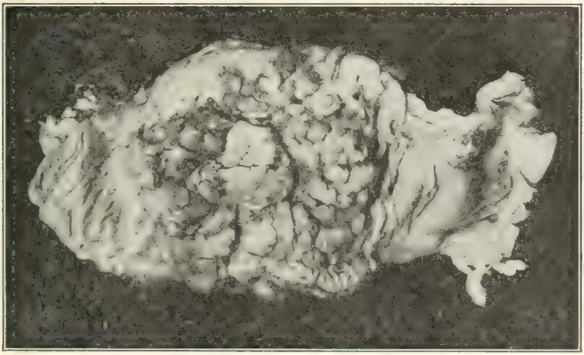

FIG. 2.—Cancer of rectum.

Convalescence was rapid and absolutely undisturbed. The bowels were first moved on the eleventh day after operation, and daily thereafter. To-day the anus looks perfectly normal, the end of the sigmoid which was primarily fastened to it has retracted and shrunk up to the intraperitoneal suture line, and were it not for a slight drop-foot caused by pressure on the superficial perineal nerve in fastening the patient on the table she would be entirely well.

An interesting feature of this case is the possibility of performing simultaneously two operations, each of which means a serious interference, and yet have as smooth a convalescence as after the simplest interference. Another point of interest is the method employed of pulling the severed end of the sigmoid through the remaining healthy portion of the rectum, and thus deriving the benefits of a normal sphincter. To my knowledge, Hochenegg, of Vienna, first employed this method about twenty years ago.

DISCUSSION.

Dr. Goffe.—In 1896 I removed a cancer of the rectum in a man through a sacral incision in which I saved the sphincter, pulled down the rectum, and attached it by end-to-end anastomosis. Four inches of the gut were removed. I put in drainage posteriorly. The patient made a perfect recovery at the time. Six years later I got track of him from his entering the Presbyterian Hospital in Dr. Frederick Brown's service. Dr. Brown told me the rectum was intact, the only reason he came for treatment was a little enlargement in the rectal fossa on the left side. He opened it, but found no evidence of cancer. I have not heard from him since, but he was well at that time being able to work at his trade of boiler-maker.

Dr. George Gellhorn, of St. Louis (by invitation), read a paper entitled

DRY HEAT AS A THERAPEUTIC FACTOR IN GYNECOLOGY.*

Dr. Gellhorn prefaced his paper with the following remarks:

When your Society, through your esteemed President, honored me by an invitation, I accepted the distinction with some trepidation because there did not seem anything I could possibly tell you. When I finally chose my topic, I was afraid you might think the fellow from the West was talking hot air to you, but if you will bear with me I will try to prove to you that there are various kinds of hot air, and that particularly in gynecology hot air is a good article. Of course the subject is rather dry, but that is in the nature of events and must be borne with equanimity. Permit me to say I very greatly enjoy the privilege of speaking to you, and highly appreciate the honor of your invitation.

*For original article, see page 31.

Discussion.

Dr. Grad.—The subject of dry hot air as a therapeutic measure was entirely new to me up to about two years ago when I had an experience with it, which was very impressive.

I was asked to operate on a case of double pyosalpinx. The operation was unusually difficult on account of the many adhesions. We drained the pelvis above and below and the patient rallied after the operation fairly well. She did well for about twelve days, when the temperature began to rise and she developed a typical case of pyemia. She would have daily chills, and the temperature would rise to 105° or 106°, and in the next few hours it would go down to normal. The case appeared hopeless. At this stage a gentleman was called in to see the case who had been interested in the subject of dry air, and he placed the patient in the Betts machine where the heat was obtained not from electric lights but from gas. He put the patient in this oven, as he called it, and the temperature was raised to 460° F. She was kept there for thirty minutes. The next day the patient missed her chill and she was given another dry hot-air treatment the following evening, and from that time the temperature became normal and the patient made a good recovery. She had seven baths in all.

The case was very impressive to me, therefore I was very much interested to hear Dr. Gellhorn say he would not use it in cases where there was elevation of temperature. In this case the temperature was very high, and yet this gentleman used it, and he tells me he uses this therapeutic measure in septic cases where there is temperature and also in cases such as Dr. Gellhorn describes.

My next experience with this therapeutic measure was in my own person, and you will pardon me for being personal. Last summer I was the victim of a septic poisoning in my finger. It occurred to me that probably the Bier hyperemia treatment would be of benefit to me. I applied to this gentleman for the application of the Bier treatment. Instead of giving that he said he could get better hyperemia by dry hot air. Here again the heat was obtained by means of gas. My arm was stripped, covered with bandages, and placed in this apparatus, 400° of heat applied for one hour. After that arm came out of the apparatus I was relieved of all pain. My temperature arose from 100° to 101°, pulse to 120. The next day my lymphangitis was decidedly better. The following day I received another treatment, and from that time my recovery seemed to be assured. Ten days later, however, I was taken down to bed with very severe pains in my joints. I had no temperature. My big toe became swollen and the pain was very intense, but no pus formed. The disturbance in my general condition was possibly due to some form of toxemia, although it was variously diagnosed as gout, rheumatism, and bacteremia. I did not know just what it was.

In this city heat is being used in cases of sepsis no matter what the temperature is. They claim some very wonderful results from it.

Dr. Brettauer.—I am much interested in the subject which Dr. Gellhorn has so clearly and concisely brought before us tonight. I wish to express my appreciation.

Years ago, when Polano published his first article in the *Centralblatt*, I had a small metal case lined with asbestos constructed, in which heat was generated by means of a small alcohol flame. For reasons then not known, the results were unsatisfactory and the treatment was discontinued.

During the last two years I have had heat applied to exudates, only it was distinctly moist heat, and therefore the temperature was never above 120°. The results were rather unsatisfactory. I see now, after hearing Dr. Gellhorn's apper, where the principal mistake in our application of this treatment was made, and I shall now endeavor to apply *dry* heat.

I would like to ask Dr. Gellhorn at what intervals he advises the employment of this treatment. The cases in which the treatment seems to be prominently called for are those of large puerperal exudates. My experience shows that these cases occur far less frequently than formerly.

Dr. Stone.—Is it possible that in all the hospitals represented here, Dr. Brettauer's is the only one where the Bier treatment or its modification has been tried?

Dr. Gellhorn.—Some of the questions that have been asked have been answered in the paper, but as they were technical details I left them out hoping that some of you might be interested enough perhaps to read the paper if you cared to adopt the method. I would be very glad indeed to state how the thing is applied. It is, of course, absolutely immaterial which kind of apparatus is used, whether the heat is obtained from alcohol, gas, kerosene, which has been used, or electricity, so long as a temperature of at least 200° can be obtained. Heat of about 220°, according to my experience, is sufficient.

The apparatus is placed over the patient, the patient lies in bed, or on a couch. The apparatus is placed over the exposed abdomen. The parts to be heated must be perfectly bare. The iliac bones are very sensitive, and also the upper portions of the thighs, and these parts can be protected because you do not need any heat there. As dusting powders and ointments have proved unsatisfactory, I use ordinary gauze over the thighs, leaving the abdomen bare. If the other parts are protected the patient does not complain of the heat at all. There is no pain if the heat is dry. In fact, I have had two cases where there were small blisters simply because the patient did not notice it. I do not put anything under the patient. Several have suggested that the heat should be applied from the back as well as from above. A well-known firm has exhibited a large apparatus in which the heat can reach the body from all sides, yet I would hesitate to put a patient in it because it looks very much like a coffin. Moreover, it is a very clumsy and a very costly affair, and it cannot be moved around, nor do I think that the application from the back is necessary because the protection of the pelvis by the bones would prevent any effect of the heat from this direction.

Dr. Broun has brought up a point that to my mind ought to give food for thought. He spoke of cases where we incise and do not find pus but where one or two days later a pursulent discharge occurs. If these cases had not been incised and had been subjected to a conservative method of absorption—these infiltrations would have healed completely; while if we incise these hard masses, the irritation of the incision, the irritation of our gauze drain and the invasion of microbes from the vagina will produce a suppuration, with its untoward sequels and the patient will be worse off than before.

I try to distinguish between the cases suited for operation and those for dry heat in the following way: In both instances the temperature is high—about 103° or more—while the pulse reremains comparatively low. The patient is kept in bed with an ice pack on her lower abdomen. If the temperature goes down, suppuration has not yet occurred within the exudative mass, and after about a week of continued application of ice, the case will be amenable to the heat treatment. If, on the other hand, the fever persists in spite of the ice-bags, we have to deal with an established abscess and must drain it according to surgical principles. I have seen about twelve cases of pelvic exudate within the last three years, but in only three of these was incision necessary.

As to the number of treatments, I hardly think that you can expect results from less than eight séances. The average number is twenty. The treatment, however, may extend over months. Yet, if we take into consideration our former impotency in the treatment of chronic pelvic exudates, even three months of treatment would not seem too long.

RESOLUTIONS ON THE DEATH OF DR. ROBERT A. MURRAY ADOPTED BY THE NEW YORK OBSTETRICAL SOCIETY.

WHEREAS, by the death of Dr. Robert A. Murray this Society has lost one of its oldest and most esteemed members, a fine type of the old-fashioned, upright practitioner,

Resolved, that we feel keenly the absence of a loyal, big-hearted friend, as well as of one who possessed to an unusual degree skill and sound judgment as an obstetrician. A man of sterling integrity, he was the friend and counsellor of a large circle for nearly thirty-five years. He was a familiar figure in this community and a constant attendant at our meetings, giving us the fruits of his experience. We sorrow over the fact that this kindly face and genial presence will never again be with us.

Resolved, that these resolutions be inserted in our minutes and that copies be sent to the family of the deceased Fellow and to the leading medical journals.

EGBERT H. GRANDIN,
GEORGE W. JARMAN,
HENRY C. COE,
Committee.

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY.

Joint Meeting with the Chicago Medical Society, March 10, 1909.
HENRY F. LEWIS, M. D., *President of the Chicago Gynecological Society, in the Chair.*

PORRO-CESAREAN SECTION.

DR. JOSEPH B. DE LEE.—The specimen I wish to exhibit to-night comes from a case of Porro-Cesarean section, which was performed two weeks ago for a rather rare combination of indications.

The patient was forty-two years of age, and this was her third pregnancy. The first labor lasted three days, and was terminated by forceps, with a living baby, said to have weighed ten pounds. The second delivery was also instrumental, but did not have such a fortunate outcome. The woman had false labor pains a month before the final delivery. These false labor pains necessitated the attendance of a physician and a nurse, but they subsided, and the woman continued four weeks in pregnancy. Finally labor came on. The physician essayed axis-traction forceps; the operation failed, and craniotomy was substituted. The woman was, according to her statement, crippled for three months after the operation, although she claims she had no fever. In the interval she had a plastic cervix and perineum operation. The present pregnancy is the one that is under discussion. Her last period was the twelfth of May, 1908, and labor was to be expected about the twentieth of February, 1909. At the end of January she had a hemorrhage from the genitals which her family physician diagnosed to issue from a placenta prævia, and ordered rest in bed without any other treatment. On the first of February another slight hemorrhage occurred as the result of an internal examination. This also subsided during rest in bed. The patient soon got up and went about her affairs until the twenty-first of February, when she was sent to the hospital because she had what seemed to be labor pains.

Examination of the patient showed the following conditions: The distance between the spines measured 25 centimeters; distance between crests, 26 centimeters; distance between trochanters, 29 centimeters, and Baudelocque diameter, 18 centimeters. The external measurements showed slight flattening, if we can place any reliance on them. The internal measurements were easily obtained and were as follows: Conjugata diagonalis, 10 1/2 centimeters; conjugata vera, estimated at 8 centimeters, plus. There were distinct signs of rickets which induced us to deduct 2 centimeters from the conjugata diagonalis. The pubis was moderately high and quite thick for such a small woman. The bispinous diameter, the distance between the spines, taken with the internal pelvimeter, was 10 1/2, and the distance between the ischiatic tuberosities was 8, and the distance from under the ligamentum arcuatum to the end of the sacrum was 8 centimeters plus. The pelvis was a generally contracted, flat rachitic pelvis, and the patient had been reserved for Cesarean section at term. The additional complication of the hemorrhages due to placenta prævia, as determined at the examination and also at the operation, made the indication for Cesarean section still more pressing. The long scarred cervix also had to be taken into consideration. Upon reaching the hospital the pains subsided, and at the urgent solicitation of the patient she was allowed to go home against advice. She returned in a few days with another slight hemorrhage, for which her physician packed at home. She complained that there had been a discharge, with considerable odor, for the last two or three days. She had no fever. The question then arose as to the nature of the Cesarean section, and whether one of the newer methods should be performed; that is, incision in the cervix above the pubes without opening the peritoneal cavity—the Frank-Sellheim extraperitoneal Cesarean section; or should the lateral incision be made in the flank after the manner described recently by Duehrssen or the modification devised by Latzko in which likewise the peritoneal cavity is not opened and the lower uterine segment is incised after pushing the bladder away from the side of the uterus; or should the old original method of doing Cesarean section, with tying off the tubes to prevent subsequent pregnancy, which the patient earnestly desired, be resorted to, or should the ordinary laparotomy be done, the uterus being amputated? The question of Cesarean section, whether or not the woman should be delivered from above, in my mind admitted of no discussion. With a placenta prævia lateralis and with a contracted pelvis of 8 to 8 1/2 centimeters, and a child which was estimated at 8 pounds, the possibility of extracting it alive from below seemed very remote, and the danger of rupturing the lower uterine segment, thinned by the insertion of the placenta, seemed so great that the abdominal delivery was indicated. For the reason the patient had placenta prævia, I did not perform one of the newer methods of doing Cesarean section; and, furthermore, that would have prevented sterilization of the patient, which I considered justifiable and which the patient demanded. At the operation, which was very typical, the uterus was removed, and I have the specimen here. The propriety of removing the uterus might be discussed, and the reasons for its removal are as follows:

First, to produce positive sterility. Here was a patient, forty-two years of age, not very strong, who would always have difficult deliveries, and who wished to be sterilized. True, the sterilization could have been accomplished by cutting off a piece of the tubes and burying the ends under the peritoneum, but the uterus was removed for another reason, namely, the woman had this unpleasant discharge; she had been tamponed, and therefore a certain amount of manipulation from below was made, and the possibility of infection was present. Therefore, on the score of infection, the large, useless uterus was removed. Furthermore, the woman was small, weighing in her natural state from 96 to 100 pounds. She had lost considerable blood, and it was the desire to spare her as much blood as possible. Amputation of the uterus is less bloody than the classical Cesarean section, with tying off of the tubes. For those reasons the uterus was extirpated, and I brought the specimen here in order to be able to show you the openings of the sinuses in the placental site. Unfortunately, the curator turned the specimen inside out, so that the uterus is inverted as an umbrella and the sinuses do not show so well.

One point at the operation that differs from the classical method might be emphasized, and it was carried out with a view to preventing hemorrhage. As soon as the child was delivered, an assistant slipped his hand behind the uterus and compressed the aorta. As soon as this was done hemorrhage stopped instanter. The uterus contracted, but whether as the result of the sudden anemia or as the result of compression of the sympathetic ganglia present in the neighborhood of the aorta, I do not know. But this uterus contracted more suddenly than is usually the case even when labor pains have been present. At the operation the woman probably lost 10 ounces of blood, hardly any more, which was a remarkably small amount of blood for Cesarean section. As soon as the aorta was compressed by the fingers, clamps were put on the broad ligaments and further hemorrhage was really minimal. The recovery of the patient and 8-pound boy has been absolutely uneventful. Some of the sinuses in the lower part of the uterus and placental site at the lower surfaces of the uterus are still in evidence on the specimen.

DR. GEORGE SCHMAUCH presented cases and a paper entitled

GOITRE IN THE MOTHER AND ITS MANIFESTATIONS IN THE OFFSPRING.*

DR. LESTER E. FRANKENTHAL read a paper entitled

EIGHT YEARS' EXPERIENCE WITH OPERATIVE INTERFERENCE IN PROLAPSE OF THE UTERUS AND VAGINA.

If the uterus is very large a *transverse U-shaped incision*, if not very large a straight incision is made across the anterior surface of the cervix.

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*For original article, see page 1.

Secondly, connect this incision with one that starts about 1 1/2 centimeters from the external urinary meatus, to sagittally meet the transverse one. We now prefer to *loosen the anterior vaginal wall from the bladder before loosening the bladder from the uterus*, believing it to be more easily accomplished while the bladder is still firmly attached. We now check all bleeding, ligating where necessary with No. 00 chromic catgut.

Next, third, we loosen the bladder up to the peritoneal reduplication. This, in prolapse cases, is sometimes very difficult: (a) because there may be *congenitally low insertion of the peritoneum*, and while we are hunting for the peritoneum at the tip of our finger, it is being undermined, and is riding on the top of the finger which is doing the separation; (b) the anterior Douglas may have become *entirely obliterated* through adhesions formed secondarily, after the prolapse is in progress (fatal cases are reported from attempts at replacement of this variety). *A male urethral sound*, as large as the meatus will permit, passed into the bladder is of great assistance here, and likewise separating the bladder laterally first, will bring one into the correct layers for median separation. Again, all hemorrhage must be checked, the cervical artery being frequently torn. *All this time the peritoneal cavity has not been invaded.*

Now separate *the lateral attachments of the bladder from the parametrium*, for, unless you do so, the bladder will be held down laterally, while at its middle it will ride on the posterior wall of the everted uterus, resembling a letter U turned upside down. Cystitis due to retention in these pockets will follow, so that in one of my earliest cases I was compelled to do a secondary operation (St. Luke's case), which relieved the condition.

Fourth, we now open the peritoneum, introduce a speculum anteriorly, push the bladder up against the symphysis and out of the way. Before, however, delivering the uterus, *we catch the anterior fold of the peritoneum in a three-inch clamp*, since it is at times exceedingly difficult to find the peritoneum after the delivery of the uterus through the opening made in the peritoneum. Especially is this true if the uterus is bulky and the introitus vaginæ narrow.

This delivery of the uterus is the fifth step in the operation.

Sixth, we at once sew the anterior peritoneum held in the three-inch clamp to the posterior wall of the uterus with a running catgut stitch as low as possible near the internal os, unless we wish to ligate the tubes.

You will note the peritoneal cavity does not remain open for more than a few seconds; besides, no blood and no raw surfaces come in contact with the peritoneal cavity. And, besides, this attachment of the peritoneum serves to hold the uterus in the exaggerated anteflexed position. If, however, the patient is still in the child-bearing period, we do not sew the peritoneum posteriorly quite as low as in the climacteric cases, since we need the peritoneum later on to assist in the perfect separation of the two cut ends of the tubes.

I then, seventh, make *a circular cut through the peritoneum of the tubes, about one and a half centimeters from the cornu of the uterus, strip the peritoneum back both ways, ligate the tube twice with fine silk, cut out a piece of the tube between the two ligatures, and then draw the peritoneum back over the raw stumps, sewing it up with fine chromic catgut, and then curling the proximal stump under itself and sewing it once more in that position.*

Eighth, *I now lead the peritoneum in between the two cut surfaces of the tube and fix it in the gap with one or two catgut stitches.* This, technically, is not very easy, but quite possible, and I consider it very essential for many reasons. It makes all of the operation extraperitoneal excepting the distal part of the tube, which is intraperitoneal, though well covered with peritoneum (I call it a peritoneal screen), and then pregnancy is thereby absolutely prevented (Ries).

If the uterus is very large, a strip may be cut out of it, and if it contains fibroids they may be enucleated.

I fix (ninth) the uterus as close as I possibly dare to the urethra against the pubic bones. I use twenty-day chromicized catgut for this purpose, beginning at the upper end of the vaginal incision, going through the vaginal mucosa *in the side of the urethra*, then the connective tissue, through the posterior wall of the uterus, and out again on the opposite side of the vaginal mucosa. Two such stitches are placed and closed at once.

Tenth, I now sew up the original transverse vaginal cut.

Eleventh, If there is redundant vaginal mucous membrane, more than I need to cover the uterus, I cut this away and close anterior vaginal wall by short running and interrupted stitches, after having replaced the cervix back into the vagina in the hollow of the sacrum.

Twelfth, and last, I do as high a colpoperineorrhaphy as the sexual life of the patient will permit, being assisted in this by the knowledge of the exact relationship of the rectum to the vagina and posterior Douglas by the examination made the day before the operation. The vagina is cleansed, packed with vioform gauze to stop all oozing, the bladder emptied, and the patient placed in bed.

SUMMARY.

The two essential features in this operation are:

1. The tamponing of the vaginal outlet and the support of the bladder by the artificially fixed uterus.

2. The repair of the perineal body, vagina, and muscles, and the narrowing of the vagina, which sustains the atmospheric pressure, while the intraabdominal pressure is brought to bear from the direction of the spine and assists in maintaining the fixed uterus in position.

3. Operative cases must be divided into (a) the child-bearing; (b) the nonchild-bearing; (c) tumor cases, and must be dealt with accordingly.

4. We must differentiate between mere hypertrophic elongation of the uterus and prolapse of the vagina and simple prolapse of the uterus. For instance, the fundus might be at its proper height; the external os might be, however, way below the spines of the ischium.

5. To Wilhelm Alexander Freund belongs the credit of first having performed the operation in its most essential features, all subsequent operations done abroad and at home are either valuable additions to or mere modifications of Freund's operation.

6. Pregnancy is the only serious contraindication to the operation other than those mentioned.

7. The operation has its limitations as described in the paper.

8. For cystocele I know of no better operation.

9. For prolapse of the uterus it is the most serviceable I have employed in the last twenty years.

10. The pelvic connective tissue is the essential factor in the maintenance of the proper elevation of the uterus in conjunction with the other structures referred to.

11. The pelvic floor does not deserve the credit of being the mainstay of the uterus.

12. Complications, such as tumors of the adnexa and uterus, can be dealt with through the same peritoneal incision. Even posterior vaginal drainage could be employed if deemed necessary.

13. The peritoneal cavity in uncomplicated cases does not remain open for more than a few seconds, therefore are the dangers of shock, infection, intestinal adhesions, intraabdominal hemorrhage, and the loss of sponges, instruments, etc., in the abdominal cavity, out of the question.

14. Sexual life is absolutely satisfactory.

15. Menstrual complications have never been observed following the operation.

16. The urethra loses its "S" shape and becomes elongated, but neither incontinence nor retention follow the operation, since I have learned how to avoid them.

17. Pregnancy must not occur after the operation just described, so that every possible conservative surgical device must be insisted upon to prevent the same.

18. In old women the operation can be done with very little pain, without anesthesia. The incision into the peritoneum and later on the skin incision in the perineum, being the only sensitive parts of the operation. The latter could be done under local infiltration anesthesia.

19. All anatomical parts touched during the operation remain extraperitoneal, excepting the stump of the distal part of the tube, and it is carefully covered with peritoneum.

20. Fatalities, barring surgical accidents, there ought be none.

21. The permanent results of the operation after eight years' experience are as perfect as after the best-known surgical methods of treating any hernia in any other part of the body; 2 to 3 per cent. of relapses being the author's results in nearly a hundred cases.

DISCUSSION.

DR. THOMAS J. WATKINS.—I have been very much interested in the operation which Dr. Frankenthal has described, as I have been doing it for a long time, as he has told you, or a very similar operation, having performed the first one in 1898. I want to congratulate him on the excellence of his paper, and I concur in practically all he has said.

I was much pleased with the way in which he described the supports of the uterus. What he said goes to prove that injuries from lacerations are not all confined to the perineum or the vaginal walls. These injuries also involve the connective tissue higher up. There are two or three points I would like to call attention to. One is the pathology of cystocele. It is an interesting study to try to determine what becomes of much of the connective tissue in the anterior vaginal wall in cases of cystocele. In a normal case, if one does a cystotomy, they find a very thick septum between the bladder and vagina; and they find in doing cystocele operations the septum has become very much thinner than they would expect from the amount of stretching of the fascia. The fascia has not only been stretched, but undoubtedly a considerable amount of atrophy has taken place.

Another point I have been looking for is the pillars of a hernia in cystocele. You know cystocele is really a hernia of the bladder, and I have never been able to find any pillars on either side, although Skene, some twenty years ago, called our attention to rupture of the septum in the median line, with hernia of the bladder and with distinct pillars of the hernial opening.

I vary the technic somewhat from that described by Dr. Frankenthal, in that I separate the bladder from the vagina by blunt dissection with scissors. I also separate the bladder from the uterus by blunt dissection with the scissors and thus save time and minimize hemorrhage. I do not suture the peritoneum, but allow it to drop over and become adherent to the posterior wall of the uterus. The operation otherwise is very much the same as that described by Dr. Frankenthal. It is rather peculiar that I have also had three cases of recurrence. In my three cases the recurrences have been protrusion of the fundus uteri through the vulvar orifice. In these cases the uterus was very large and the prolapse complete. Of late I have been doing what Dr. Frankenthal has spoken of, namely, not only removing part of the anterior wall, but almost the entire anterior wall of the uterus and dissecting out all of the mucosa, leaving the posterior wall of the uterus to support the bladder. I agree with Dr. Frankenthal that this is the only operation that seems to give absolutely certain results in the cases of large cystocele. It is practically impossible to close up the opening between the pubic bones and the broad ligaments with nothing short of plugging it up with the body of the uterus.

As regards the greatest objection which can be made to this, namely, that of pregnancy, it is rather fortunate that most of the bad cases of prolapse and cystocele occur after the menopause, so that the question of pregnancy does not have to be considered.

Dr. Albert Goldspohn.—It seems peculiar, yet necessary, to state that the pelvic floor is not a regular support to the uterus, but from opinions we hear advanced so frequently and from what we see in print it is quite in order to state as one of the principles that the pelvic floor is a separate structure from the uterus, and has to do with the support of the uterus only in times of voluntary forcible pressure from above, the exercise of intraabdominal pressure, as during defecation, urination, etc. If, at that time, when the uterus is forced downward upon the pelvic floor, there was no diaphragm in the woman's pelvis which declares a halt to the downward movement of the uterus, the supports of the uterus would be overtaxed, and could no longer hold it in its proper place. It is due to the exercise of its physiological action or extreme pressure from above that the pelvic floor is, for the time being, a support against the excessive elongation of the proper actual uterine supports.

In regard to the operation for prolapse of the uterus, it is true that the Wertheim operation, as it is called, as practised by the gentlemen who have spoken, will cure prolapse; but is it necessary, in order to do this, to turn the uterus away so far from its normal axis in the woman's pelvis as that operation does? If any infection should thereafter occur and produce endometritis, the endometrium would be beyond reach, and one could not do anything with it except to extirpate the uterus; and then he would have a deplorable situation for the prolapse if he had to remove the uterus after that operation. It is considerations of this nature that have deterred me from going so far as to do the Wertheim operation, because I do not think it is necessary in order to cure prolapse in a woman who cannot conceive. There is no difficulty in curing prolapse, with very few exceptions, without this extreme Wertheim procedure in women whom we can sterilize or who are sterile. It can be done by displacing the bladder from the front of the uterus on top of the fundus uteri and then fixing the anterior surface of the uterus to the vaginal wall, making thorough vaginal fixation with a broad fibrofibrous union. And in order to make this more durable, combine the vaginal fixation with the suggestion of a German, whose name I cannot recall now, of doubling up the anterior redundant vaginal wall, instead of removing it, by drawing one side denuded under the other, doubling it; and if doubled, it will support the fundus especially if attached to it above by a broad denuded surface, creating a fibrous union that will not let go. This, with an effective operation upon the levator ani and pelvic fascia, to restore the pelvic floor, will almost never permit a return of prolapse, in case the vesicocele is not extremely large. If that is the case, however, so that the anterior wall, instead of being partly raised within the woman's pelvis, protrudes outward in a downward direction, so that the anterior part of the vagina has an outward inclination entirely, then we cannot do this vaginal fixation to advantage, but we can do ventrofixation along with the vaginal plastics, and the condition of the bladder then will be more healthy than it is in those cases where it is detached and placed on top of the uterus, on the fundus or on the upper side of the uterus. There is no difficulty about curing prolapse in such women who need not conceive; but the difficult problem has not been mentioned by the essayist, and that is how to cure prolapse in those women who ought still to bear children. In this country we are not in that dilemma often. The cases of prolapse we see are in women who are old enough generally to surrender their reproductive capacity, if they have not lost it already. Across the water, where women labor, there are not a few instances of young women who still want to bear children who have a prolapse, and there is the deficiency, the missing link, that our surgical technic in gynecology does not yet fully cover, namely, how to fix the uterus so that it will be harmless in the course of pregnancy and labor, and yet sufficiently secured, so that when combined with anterior and posterior vaginal plastics, it will not permit a recurrence of prolapse. If I had such a case to deal with, I would do transplantation of the round ligaments, reenforcing them with abundant peritoneum from the broad ligaments, into the abdominal wall, not attach the uterus itself to anything, but draw good substantial masses of round ligament, reenforced with peritoneum, into stab wounds made through the muscle and fascia of the abdominal wall after doing a solid anterior colporrhaphy in the manner above described and a thorough restoration of the pelvic floor and perineum.

Dr. A. Belcham Keyes.—I have been extremely interested in Dr. Frankenthal's paper, and I feel that he has made the main points very clear, especially with regard to the normal situation of the uterus, and yet the question arises, Does one kind of operation cure all kinds of cases? This question is a very interesting one, and is a very difficult one for us to decide. Cystocele is one of the most puzzling things we have to contend with. There is often a congenital looseness of the connective tissue between the bladder and the cervix and vagina, which may be considered as one of the particular causes why cystocele is common and quite frequent in very young women. I would like to have heard Dr. Frankenthal say more about that, namely, why we have this marked looseness of the uterocystic connective tissue and marked cystocele often without any marked prolapse of the uterus. Rectocele, we know, is not so liable to occur without perineal tears as is cystocele, on account of the greater tightness and strength of the perirectal connective tissue, yet both of these are in direct continuation with the parametrium. We should not forget that there is prolapse of the uterus which is brought about by looseness in the structures of the upper part of the pelvic floor, in the loose connective tissue which often also occurs in women who have not born children. These are primary prolapses and probably the cases that have a marked congenital looseness of the parametric connective tissue; they are more puzzling to us etiologically than those we encounter after labor. Vaginal prolapse is peculiar in that the prolapse occurs anteriorly and posteriorly and does not involve the vaginal wall in a circular fashion, as in rectal prolapse which comes down circularly. From primary prolapse of the vagina after perineal tears we often have a secondary prolapse of the uterus, especially if the uterus does not assume its normal position in anteversion at a normal height. If it is retroverted it is capable of being pulled down by the vagina, the walls of which are dragged on from below by cystocele and rectocele, and cause a secondary prolapse from dragging on the uterus. We see many cases in the clinics that are a combination of primary and secondary prolapse, where the uterus is not prolapsed altogether by traction from below, but there is an independent deepening of the fornices and lower position of the uterus. As to whether the uterus is anteverted or retroverted in these cases it does not make much difference in many cases, but there is usually more or less tendency to retroversion. I believe it is important for us to differentiate the types of prolapse of the uterus whether partly primary or partly secondary from those due entirely to the vaginal-wall traction. You must not forget that while this operation anteverts the uterus, we have prolapse in cases of marked anteversion.

In speaking about conditions connected with the pelvic floor, I firmly believe we should not talk about the floor of the pelvis, but the "*inferior abdominal wall*" is a much better term. In the anterior abdominal wall, the canals run obliquely, so that the intraabdominal pressure acts by pressing the canal walls together. If we speak of the floor of the pelvis, the uterus is not included. The uterus spreads the intraabdominal pressure to the lateral attachments of the levator ani muscles, and the recto-vesical and levator ani fascia. Personally, I have never been able to convince myself that I would undertake an operation like this for the relief of this condition; at the same time, I wish to confess I do not know a satisfactory operation for prolapse of the uterus. I have been very much interested in having heard of Dr. Frankenthal's success. What he has told us about the connective tissue in the pelvis I believe is perfectly right, but what causes this pelvic connective tissue of the parametrium to become relaxed? Also what causes the paracystitic and paraproctitic tissues to become extremely relaxed in one type of infection, but in another type of infection we find strong scars to be the mainstays of the pelvic organs.

I would like very much to hear what Dr. Frankenthal has to say about the pathology of the connective tissue, and particularly with reference to the point as to what makes the strong connective tissue at one time and loose connective tissue at another.

Dr. Channing W. Barrett.—I rise to speak more of principles than details in considering this subject of operation for the relief of prolapse of the uterus. I think to anyone who has followed this operation there arises no doubt as to its ability to fix the uterus at a given point in most cases, the uterus perhaps coming down in a small percentage of cases. But this operation fixes the uterus at the low point at which it prolapsed, turned bottom side up, and in a cramped or pathological position. It is quite like the fixation of a slightly movable kidney at the lowest point at which it can be moved. It is like undertaking to cure an inguinal hernia of the uterus through a large opening by sewing the uterus in the canal without the hernial opening being closed. There are certain things which must be done in work of this kind. We have to deal here, as Dr. Keyes has pointed out and laid stress upon, with the importance of the lower wall of the abdomen. The pelvic floor, so-called, being the most important part of the wall of the abdomen, needs to be the strongest. In human beings who walk in the upright position, that strength is given by the levator ani muscle, and that should furnish a strong but indirect support for the pelvic and abdominal organs. In these cases of prolapse we are dealing with a hernia just as much as in a case of hernia in the inguinal region, and to cure that hernia we have got, first, to get a good, strong pelvic floor. We have got to make the lower wall of the abdomen strong, and we do so by uniting the levator ani muscle. We could make it stronger if we did not leave the vagina patulous; but it must be left patulous in most cases. Only a few patients are willing not to have it left so. We must not only create a good pelvic floor, thereby carrying the lower end of the vagina forward, but we must carry the upper end of the vagina well backward to put it in an oblique direction, so that the same conditions may obtain that obtained in the first place. We have the anterior segment coming down upon the posterior. The same conditions obtain in the anatomy of the inguinal region, the internal oblique pressing against the external. In addition to that, we must not only have the upper end of the vagina carried backward, but the uterus must be put at an angle to the vagina, and that does not mean necessarily that it must be put at such an angle that it is parallel with the vagina and sewed there. This would be a most unhappy condition, of course, as the essayist has said, if pregnancy should occur, it would also be an unfortunate condition if any pathological condition should develop in the uterus. We should deal with these cases so that these conditions can obtain: A good pelvic floor, the vagina put in an oblique direction, to force exerted from above, and the uterus put at an angle with the vagina. In these cases we are frequently dealing with patients who have passed the menopause. They have pathological uteri in a great many instances, and hysterectomy should be done, and in cases in which hysterectomy is not needed, any operation which throws the cervix backward and the uterus out of line with the vagina is a much less pathological operation, and I am not in the posit on that Dr. Keyes says he is, that we know not what to do in cases of prolapse. We are dealing with a hernia, and that hernia can be cured as absolutely as any other condition.

It seems to me, we have arrived at a time when we should not talk about atmospheric pressure as a support of the uterus. It is entirely a myth. The same conditions obtain within the abdomen, so far as the supports are concerned, as obtain in this room, and atmospheric pressure will no more sustain an organ in the abdominal cavity than it will sustain a chair in the air.

Dr. Carl Wagner.—Women in the child-bearing age must not be subjected to this operation, unless there exists, at the same time, an indication for sterilization. This was illustrated to me two years ago in a case in which a gynecologist had performed the Freund operation for prolapse two years previously. The complications during labor were so great that Dr. Hoag, who had associated with me in the case, and I had to resort to Cesarean section, which fortunately saved both mother and child.

Dr. Frankenthal (closing the discussion).—The first gentleman who spoke said I had left out the essential part of my paper, namely, as to what operation should be done for prolapse of the uterus in women who wished to become pregnant and could not be operated by this method. He missed the object of the paper. I did not say this was the operation I performed on women who were to become pregnant, but that I did it on women who are not to become pregnant—women who had a sufficiently large number of children, and who were satisfied to have this operation done after due consideration, even going so far as to say to a woman that your children may all die of diphtheria and sacrlet fever, and then what would you do? Would you be satisfied if this operation was done on you? I think this criticism is out of the question entirely, so far as the purpose of the paper is concerned. In the next place, reference was made by the doctor to the unfortunate position of the uterus in cases of infection of the endometrium. Personally, I have not had very much success in treating the endometrium at any time and in any way, so that in the event of the endometrium becoming infected, I personaly think it would take care of itself just as well, without any treatment, curettage, topical applications, etc., as by methods the doctor might use.

The other question that was asked was as to the reason why cystocele might occur and the uterus prolapse. It was stated in the paper that in many cases there is an unusually low insertion of the anterior peritoneum as well as posterior peritoneum, though it need not be both. In these cases there is very little cellular tissue between the uterus and bladder. There is likewise very little cellular tissue in front of the bladder to hold it in position. I could not go into anatomic details in my paper. The question comes up, Why do hernias occur in any other part of the body? Probably a hernia occurs on account of poor development of that particular structure.

We are all very familiar with the position of Dr. Barrett in regard to this subject, and I do not think it is necessary to answer him, because I have my own views on this subject, and he has his. I have given you the reasons for this operation, and if I were to answer Dr. Barrett, I should simply repeat parts of my paper.

Dr. Charles B. Reed read a paper entitled

PUBIOTOMY: AN OPERATION FOR THE GENERAL PRACTITIONER.*

DISCUSSION.

Dr. Charles E. Paddock.—Any operation which has for its object the lessening of accidents during childbirth and the reduction of infant mortality and morbidity in delivery is welcome, and the essayist has shown that pubiotomy or hebosteotomy will do this.

I am glad to be able to agree with him in some respects as to the value of the operation. Symphysiotomy has, I believe, had its day. It came in a decade ago, heralded by numerous statistics, favorable and unfavorable, depending a great deal upon the enthusiasm of the operator. In this country it was short-lived, but in localities there are still advocates who report wonderful results.

Personally, I am not in favor of the operation of symphysiotomy, and believe the operation of hebosteotomy will accomplish all that is asked of symphysiotomy, with lessened risks to the mother.

Pubiotomy has in its favor the usual quick recovery of the patient, whereas symphysiotomy requires a long convalescence, thirty days at least being the earliest time at which the patient is allowed to get up.

Pubiotomy requires no specially prepared bed, neither need the woman be placed in a cast or any especially prepared bandage.

Pubiotomy is followed by bony union, while the result in symphysiotomy is a fibrous union. At least, this is my conclusion, although the essayist states to the contrary.

I must take issue with the essayist as to the simplicity of this operation. It is simple if your technic is good. If not, grave results may ensue. In the hands of skilled operators the bladder has been punctured, the hemorrhage has been severe, and in one case the patient bled to death in spite of the operation. Rupture into the vagina with subsequent infection, etc., are reported. With these facts before us, I do not believe that the operation is one for all doing obstetrical work, neither do I believe because of the numerous complications reported that it is an operation for the home, but should be done in a hospital.

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*For original article, see page 100.

My experience so far has been but one case, and I am as enthusiastic as the essayist as to its good results. In the case which I have not yet reported the patient suffered no more following the operation than following an ordinary delivery, and at the end of two weeks she left the hospital apparently perfectly well, with good firm union.

DR. VICTOR J. BACCUS.—With reference to the armamentarium referred to by Dr. Reed, I have had some experience with the Gigli wire saw in operating on other bones than the pelvic, such as resection of the elbow, and it is my experience that the Gigli saw breaks easily, and instead of having one it would be well to have two or three, at least, at hand.

DR. CARL WAGNER.—Pubiotomy is still a very open question, as we may recognize from the fact that every year new methods are advanced. The tendency is to effect a permanent enlargement of the pelvic ring.

The osteoplastic operations which have enjoyed a wider reputation are those of Credé, Hammerschlag, and Schickele, and the more recent one of Bumm. With the exception of the latter, they are all objectionable from a purely surgical standpoint. Credé's operation consists in the removal of a piece of the ramus horizontalis of the os pubis, and implanting it between the cut surfaces of the bone after pubiotomy. There is great danger of suppuration of this isolated piece of bone. But even without suppuration there is another great objection to the Credé operation, consisting in the fact that the resection of a piece of bone produces a defect in an important part of the ring of the pelvis at the foramen obturatorium, because on this part the recti muscles of the abdomen and the fascia of the ligamentum Gimbernati are inserted. This defect creates a disposition to the formation of hernia, which will surely follow if the periosteum on the posterior aspect of the bone cannot be preserved intact during the operation. This step of the operation alone constitutes a difficult test for the surgeon's skill. A safer method would be the interposition of a heterotope bone, like from the tibia, as Hammerschlag proposes, or the doubled bayonet-shaped bone plastic of Schickele. Bumm tries to solve the problem by dividing the pubis in an oblique line through the descending ramus toward the angle at its symphyseal end. He has devised a special needle which I show you here. This differs from the Doederlein and Bachelle needle in so far that its curve is on a line with the axis of the handle, is somewhat larger, and is introduced from below. The manipulation of the instrument is in itself simpler, and being inserted from below, is not hampered by the abdominal motion during labor contractions. The oblique division of the bone leaves quite a projection on each side, the terminal ends of which will serve as means for apposition and bony union. It is claimed that danger from hemorrhage is much less, and results in general satisfaction, a statement which has been substantiated by forty-odd cases reported a year ago.

Dr. Reed (closing the discussion).—I am very glad to have the valuable support of Dr. Paddock in the cases we are discussing to-night. I could not ask for more satisfactory testimony of the value of this operation than that which has been given. I did not intend in any way to minimize the importance of the operation by saying that only three instruments were necessary for its performance. I did not mean that it was necessary to leave all other instruments at home, but it is nevertheless true that the operation can be done practically with the three instruments I have mentioned. The operation is simple, and if a practitioner has not mastered the technic he can acquire it without difficulty. To anyone who has seen the high forceps operation done, who has seen the terrible mortality following it, who has seen the great difficulty in delivering a child by version through a contracted pelvis, and knows that this simple expedient will relieve the situation entirely, he is not taking advantage of all the resources at his command if he does not utilize this procedure. So far as high forceps is concerned, Tarnier himself in a public avowal has acknowledged that so far as the child is concerned, the mortality is equal almost to craniotomy; and so far as concerns the mother, the results are much worse than those of craniotomy on the child, so that I cannot see but what my position is justified. I do not think everybody is going to do pubiotomy, but a slight experience on the cadaver and a selection of cases is all that is necessary to relieve us from, at least, 50 per cent. of the horrible consequences of high forceps and difficult versions and extractions where the child is imperiled, the mother crippled for life, and the physician is exhausted for a week thereafter.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of February 5, 1909.

The President, I. S. STONE, M. D., *in the Chair.*

The paper of the evening, by DR. E. P. DAVIS, of Philadelphia, was on

THE SURGICAL TREATMENT OF COMPLICATED VAGINAL PARTURITION.

The subject was considered under three heads: Hemorrhage, Infection, and Shock. Hemorrhage was in part preventable by using ether as an anesthetic, giving strychnine during labor, and ergot after labor. Then the uterus should be packed with gauze rather than irrigated with ice or vinegar. Infection was to be prevented by moderate cleansing of the woman's parts with warm lysol in the simple cases or shaved and surgically cleansed in cases before intrauterine manipulations. Closure of lacerations especially in the cervix prevented infection. Such suturing was done at times twenty-four to thirty-six hours after labor, but never a week postpartum. Shock was to be prevented by early operation under ether and the use of strychnine and ergot. Many of the cases called shock were truly the effects of hemorrhage.

DISCUSSION.

DR. FRY discussed the subject of hemorrhage, noting the two types of bleeding, one from the placental site and the other from a laceration. The lacerations of the canal should be sewed up, but the cervix lacerations should not be sewed up, as a rule. Eighty per cent. of the cervix lacerations had been reported as healing without operation. The hemorrhages from the placental site could be controlled not only by strychnine, but also by quinine during and ergot after labor. He thought that introduction of the hand or instruments into the vagina was not desirable, if it was possible to avoid it and hence massage of the uterus through the abdomen and ice applications to the abdomen were his first resource. Then he used an intrauterine douche of sterile water or salt solution at 120°, and if that failed used the intrauterine packing, but always with the feeling of the risk of infection. This he removed after twenty-four hours and followed its removal by a hot salt solution douche.

Dr. Moran discussed the question of infection and said that he did not use disinfectants in the parturient canal, preferring salt or water. In the cases of sepsis the germs were already beyond the reach of any douche, and in sapremia water was all that was necessary to remove the remaining uterine contents. He thought that infections might be reduced by the suture of the deep cervical lacerations, but all lacerations were not to be sutured.

Dr. Miller agreed with Dr. Davis that shock was a rare condition and could be prevented in large part. The differential diagnosis from concealed hemorrhage, ruptured or inverted uterus always had to be considered as did the syncope of heart origin and bodily exhaustion, none of which were true shock. The treatment of shock was rest, mental and physical, such as could be obtained by the use of morphine.

Dr. King commented on the variation in the physiology of labor in woman from that of all other females as the cause of hemorrhage, infection, and shock. The position of the woman in bed was abnormal, the squatting posture being the natural and most efficient in expelling the uterine contents. The care of the infant by an outsider was also unique and the natural nursing of the child would tend to prompt uterine contraction. Ante- and postpartum examinations of the uterus and vagina by the hand of the man was also unnatural. Thus the physician produced many evils for which later he had to find a cure. A return to physiological procedures would be a great advance. The goal of obstetrics should be to become at least skillful enough to avoid vaginal examinations and learn all that was essential by abdominal examination.

Dr. Stokes noted the fact that it is the Japanese custom still to go through labor in the squatting posture.

Dr. Bovee was pleased to note the reference to suture of the uterosacral ligaments to prevent retroversion. In the treatment of shock Boise had long ago learned that the condition was one of spasm and had found the treatment by opium and atropine the most efficacious. Crile had recently added the administration of salt solution continuously. Under this treatment strychnine and ergot were not needed.

Dr. Davis, in closing, said that he saw very few normal cases of labor because in his practice he attended either the rich or the charity hospital cases. He used the lateral posture exclusively, and did his best to get a spontaneous delivery, but when it came to operation he got a professional anesthetist and took all the precautions of a laparotomy including the assistance of two nurses. He also charged surgical fees. As to the treatment of hemorrhage he packed the uterus in every case because he considered that every woman who was unable to deliver herself had inefficient contractile power in the uterus and ought not to be allowed to run the risk of hemorrhage. He packed with 10 per cent. iodoform gauze.

Meeting of February 18, 1909.

The President, I. S. STONE, M. D., *in the Chair.*

DR. J. D. MORGAN read the essay of the evening on

ACUTE ANTERIOR POLIOMYELITIS.*

DISCUSSION.

DR. GRASTY opened the discussion noting as one of the synonyms for the disease West's morning paralysis, on account of the frequent discovery of the paralysis when the child woke up in the morning. The type of the paralysis was more often para- or monoplegia than hemiplegia. The differentiation had to be made from spastic paralysis of cerebral origin. The epidemics seemed to show that the cases were due to infection through the alimentary tract with subsequent distribution by the blood and lymph to the central nervous system. The late treatment should be orthopedic but in the subacute stages he thought electricity good for muscle exercise and circulation.

DR. WM. A. WHITE said that the microbic origin of the disease was proven by the epidemics and the occurrence of several cases in one family during a short period. That the selective affinity of the disease for the cells of the anterior horn cells was not explained further than by calling it a thrombosis of areas supplied by these single arteries. Tabes dorsalis, on the other hand, which was the corresponding lesion of the posterior half of the cord was a meningitic affection in which brain peduncles, motor tracts, bulbar nuclei, and even the meninges at times were involved, and so was to be considered as a widespread disease as compared with the anterior horn cell destruction of anterior poliomyelitis. In some cases there was a very extensive involvement at the onset, all four limbs being paralyzed, and yet the final result gave paralysis of only one limb. The process of improvement might continue for a year if all the muscles were kept active, and during that period of possible improvement no tendon transplantation or nerve decussation operation should be tried. The treatment in the acute stage was rest. But as soon as possible voluntary movement of the leg should be sought. This was often possible in a warm bath when it was not possible in the air. The case reported by Dr. Morgan showed probably a limited involvement of the meninges as evidenced by the partial Kernig reaction. The involvement of the abdominal muscles might be the only symptom.

DR. SHANDS said that fourteen years ago he had discussed the early mechanical treatment of anterior poliomyelitis. Bearing on intestinal infection as the origin of the disease 63 per cent. of the cases reported by Dr. Gibney followed attacks of diarrhea. The limb should be protected, especially at the joints, to prevent distortion due to position. Six months' would cover the time of improvement. Braces should be applied by a physician, not an instrument maker, in order to support the proper muscles. He showed casts of club-feet following poliomyelitis paralysis of various groups of muscles. He noted the change in growth of bones in the cases where the trophic nerves were affected. He said that electricity and massage would not restore degenerated nerves and muscles, though they might develop parts of muscles.

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*See original article, p. 1061, vol. lix, No. 6.

Dr. Carr said that these cases were a great prey for quacks, and therefore the physicians should do everything possible to hold their confidence. The greatest improvement occurred in the first six weeks, and after that galvanic electricity and massage helped to keep up the nutrition of the muscles during the subacute stage. He had seen one case in which the arm had had a humerus, the size of a lead pencil, while the forearm was of normal adult size. The humerus had been fractured and the subsequent history of the fracture was perfectly normal in spite of the evident trophic change in the bone. In another case an adult with an infantile leg due to trophic changes in the bones had had the leg amputated. In the acute stage the physician should attempt to limit the spread of the disease by keeping the patient lying on his face on a water-bed and applying cold to the spine.

Dr. Wall called attention to the fact that in epidemics meningeal types of the disease were recognized. Some of the cases showed the intense type of coma at the onset followed by more or less complete paralysis. He thought that massage did good in keeping up the tone of the muscles and might stimulate the growth of the nerves and make them gain new functions.

Dr. Adams considered acute anterior poliomyelitis a very deceptive disease. The early diagnosis was not feasible, except by exclusion, before paralysis set in. The earlier symptoms were those common to all acute infectious diseases, and after two to five days paralysis sets in. If there was no improvement in six to eight weeks there would be none, though other muscles might learn to compensate for the loss of those paralyzed. The treatment after the diagnosis was orthopedic to prevent deformity. He knew of no means of preventing the extension of the disease.

Dr. Acker had read a paper on the subject seven or eight years ago. In the New York epidemic peculiar types of the disease were seen with intense neuritis and meningitis. The condition seemed to be associated with other infectious diseases. In Washington, some years ago, he had seen eight cases in one year, and that he considered as a small epidemic. The cases in the hospital improved so much in the first six or eight weeks that as a rule they were discharged, but they continued to improve in function for six to twelve months.

Dr. Wellington said that when he had been in the hospital he had tried electricity and strychnine to attempt to improve the function of the paralyzed muscles, but saw no benefit from the treatment.

Dr. Morgan, in closing, said that he considered Dr. White's suggestion of the movement of the leg in a bath a very useful one. In some cases the tympanites was due possibly to paralysis of the abdominal muscles. The cervical and lumbar cord regions were more often affected because of the poorer circulation in those parts. The treatment should be sought in the line of a serum for this specific organism. In some cases the diplococcus intracellularis had been found, and in these Flexner's serum might be of advantage.

Meeting of March 5, 1909.

The President, I. S. Stone, M. D., *in the Chair.*

Dr. Vaughan presented a specimen of

RUPTURED TUBAL PREGNANCY WITH AMNION UNBROKEN, GIVING SYMPTOMS OF DISEASE OF THE BILIARY TRACT.

The patient was a woman thirty-five years old, married eight years, and had had several abortions, the last one over two years ago. During the last two and one-half years she has suffered much from attacks of pain in the epigastrium and region of the gall-bladder and region of the right shoulder-blade, also vomiting. These attacks came on at intervals of a few weeks or a few months, and were regarded as gall-stone colic, especially as jaundice sometimes occurred.

The patient considered herself pregnant, as there had been no menstruation for two months, and her family physician Dr. Ward confirmed this diagnosis. When called to see the patient I agreed with the family physician as to there being trouble with the biliary tract and the necessity for an operation, as the paroxysms of epigastric pain and vomiting were frequent and severe.

At the operation nothing abnormal could be detected about the gall-bladder, ducts, liver, pancreas or stomach, but the great omentum was found attached below, and on making traction the attachments broke with considerable hemorrhage in the region of the pelvis. Further examination disclosed a tubal pregnancy, the fetus being situated in the right Fallopian tube surrounded by blood-clots, except in front, where evidently the great omentum had been attached, and through the transparent unbroken amnion the fetus was clearly seen, apparently slowly moving from side to side. The margins of the ruptured tube from which the omentum had been detached were still bleeding and many blood-clots of different age were seen in the abdominal cavity. The tube with the fetus was removed, leaving the ovary and the abdomen closed. Uneventful recovery. The important point in this case is the presence of pain in the epigastrium and the jaundice which caused an erroneous diagnosis of biliary trouble to be made. The explanation which occurs to me is that the attachments of the omentum to the tube caused pain in the epigastrium when traction was made on the omentum, and that the jaundice was due to the absorption of the blood effused into the peritoneal cavity.

It is possible that further observation may reveal some disease of the bile ducts, liver, or pancreas which could more satisfactorily explain the paroxysms of pain and the jaundice.

DISCUSSION.

DR. J. TABER JOHNSON did not consider the jaundice as other than an accidental complication of the tubal condition. He discussed the point of deferred operation in cases of ectopic pregnancy with rupture, and said that the operation was just as imperative as in any other acute condition, and that it was not justifiable to attempt to postpone the operation until fetus was of viable age, on account of the marked increase of danger to the mother.

DR. STONE did not believe that the epigastric pain could be accounted for in the pelvic origin with pains due to omental traction on adhesions. He thought that the yellow discolorations of the skin should be subdivided into groups and the term jaundice limited to those of hepatic origin and confirmed by other signs of presence of bile in other places.

DR. SOTHORON asked if a vaginal examination had been made with the patient under the anesthetic.

DR. ABBE suggested that since the jaundice and epigastric pains had preceded the time allowed for the development of a fetus of this apparent age by over two years that they must be of some entirely independent origin, and that two separate and independent diseased conditions were present—the extrauterine pregnancy and some lesion in the upper abdomen. Since examination of the gall-bladder and its ducts and the liver showed nothing grossly abnormal, the probability of a chronic pancreatic disease seemed most probable, even though the head of the pancreas had on examination seemed normal, since it was well recognized that a chronic pancreatitis might exist and be dependent on wholly microscopic changes in the gland. The symptoms of biliary colic attacks and of jaundice associated with the negative findings were very suspicious. The diagnosis was not an easy one to make, but Mohnihan had suggested two or three additional points seeming to indicate pancreatic disease that might be helpful; these were the increased tendency to hemorrhage, the itching associated with the jaundice, and the presence of the Cammidge reaction in the urine.

DR. BOVEE suggested that the vomiting itself might cause the epigastric pain. He noted the marked absence of the symptoms of ectopic pregnancy of which uterine hemorrhage is almost characteristic. He also thought from the symptoms and the superficial examination of the specimen that the condition was rather one of tubal abortion, not tubal rupture. He did not think the epigastric symptoms due to the omental adhesions.

Dr. Wood had sent the patient to the hospital for operation and had watched the patient for some time. He thought that there had been symptoms of tubal rupture the day before Dr. Vaughan saw her. That the gall-stone attacks had been almost characteristic and had lasted for two and a half years. During this last attack of pain the uterus had seemed very low in the pelvis and the pelvic pain had been marked. The uterus had been tamponed for some time. There had been marked pallor in this last attack. The patient had had a previous abortion and subsequent pelvic inflammation.

Dr. Vaughan thought the jaundice due to the blood absorption, and said that he had not been able to make a diagnosis of chronic pancreatitis.

Dr. Bovee read the first paper of the evening on

LARGE POLYCYSTIC KIDNEY.*

Dr. Neate followed with a paper entitled

THE ETIOLOGY AND PATHOLOGY OF BILATERAL POLYCYSTIC DEGENERATION OF THE KIDNEY.†

Meeting of March 19, 1909.

The President, I. S. Stone, M. D., *in the Chair.*

Dr. J. Taber Johnson presented a specimen of

MESENTERIC TUMOR.

Mrs. A., white, mother of three children, age thirty-six, was sent to me from Culpepper, Va., on the fourteenth of March, on account of a large abdominal tumor, which had been variously diagnosed as soft fibroid of the uterus; ovarian tumor, partly fluid and partly solid; fibrocystic tumor; pregnancy; malignant tumor of some abdominal organ, etc. It turned out that I had operated on this lady in April, 1907, for the removal of a large tumor of the mesentery. It must have been of considerable size and solid, as the scar of the incision extended at least three inches above the navel. Patient remained well until last October, when she noticed a lump in the right side of her abdomen just below her liver, and she insisted in all the interviews I had with her that the enlargement grew from above downward. I did not think so, as the percussion note in the upper and right abdominal region was decidedly tympanitic. This note was distinct on the left side where we could distinctly feel the harder parts of the tumor. The only two symptoms of which she had complained were occasional irritation of her bladder and a persistent cough. Curiously enough, these were the chief symptoms accompanying her tumor, removed two years, and they immediately ceased after its removal, as is the case after the removal of this tumor. The specimen is presented as another illustration of the difficulties in the way of a correct diagnosis, and also of a safe removal of unusual abdominal growths. My own opinion leaned toward its being an ovarian tumor which had undergone malignant degeneration. The presence of ascitic fluid free in the abdomen, its rapid growth, and few symptoms were principally responsible for this view. Dr. Kelly saw her with me and thought the tumor was malignant, partly from its rapid growth and the color of her skin. Her abdomen was opened by an unusually long incision last Wednesday, at 3 P. M., and the specimen on the table removed. It weighs about 25 pounds, and appears to be another mesenteric tumor.

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* For original article, see page 47.

† For original article, see page 61

The most troublesome and dangerous complication was on account of the very intimate attachment of about twelve inches of intestine to the tumor; it seemed to be almost enveloped in one of the outgrowths and required long and tedious dissection not only to free it, but to repair the damage later on to the mesentery. I think I would have resected a foot of the bowel had not the anesthetist warned me that the patient was badly shocked and would not stand much more operative work. I was surprised after the separation of the omental mesenteric and intestinal adhesions. When I passed my hand down into the pelvis to ascertain the kind of pedicle we had to deal with to find the pelvic organs normal, and as the hand was removed the tumor rolled off the abdomen into my hands.

The patient surprised us again by doing so well. She is now in the second quarter of her third day with a temperature of 99° and pulse of 92. Has passed large quantities and had two good passages of the bowels, is unusually bright and cheerful, asks for a second pillow under her head and for more to eat. She was assisted out of her primary shock by frequent rectal injections of salt solution and hypodermics of strychnin. The specimen looks like a big fatty tumor, but as our hospital pathologist has not yet reported his findings it might be referred to our microscopical committee for investigation and report.

Dr. Abbe said that in view of the recurrence of the tumor, its location, and appearance, it would seem like a lymphosarcoma of the mesenteric lymph nodes that had undergone myxomatous degeneration.

Dr. Miller had seen a similar tumor removed by Dr. Howard Kelly in which also the intestine had been completely surrounded by the mass.

Dr. Johnson said that the majority of operations on mesenteric tumors were fatal on account of the shock, and that in this case he still feared trouble from the loss of mesenteric attachment to the intestine.

DR. J. THOMAS KELLEY read a paper on

CONSERVATIVE SURGERY IN THE PELVIS.*

DISCUSSION.

DR. MILLER endeavored to be conservative in everything except malignant disease and then he was very radical. He thought the extent of disease in the ovaries was in many cases uncertain. That cysts and hematomata often gave no symptoms and were merely follicles undergoing physiological changes and needed no operation. In gonorrheal cases both tubes were, as a rule, affected eventually, if not at the time of operation, and hence he considered it conservative to remove both tubes, even though they did not appear essentially diseased. Even then adherent ovaries were apt to give symptoms, and yet he usually tried to leave one ovary.

In cancer cases or suspicious cases he thought it desirable to await the pathological report before extensive operation. The whole question of conservative surgery was one based on large experience and personal judgment.

DR. TABER JOHNSON had been bitten by the germ of conservative surgery, but had reacted, and now believed that in many cases radical operation is the most conservative treatment aimed at the cure of the patient's disease.

DR. VAUGHAN did not think that gynecologists would be as radical as they are if they were women, and yet in badly diseased ovaries he did not think it conservative to save a small part of an organ.

DR. SPRIGG said that it was very difficult to tell when ovaries were diseased and when they were savable. He thought the woman herself should be considered.

DR. SOTHORON would have conservative surgery taught in the medical schools in place of the previous radicalism.

DR. KELLEY said that conservative surgery sounded beautiful in its talk of preserving maternity, menstruation, and internal secretion, and to consult the women as to what should be done. But when the question was put to them directly 90 per cent. of them would say remove all trace of disease and leave no chance of its recurrence. He thought that it behooved all of us to study our cases more thoroughly in order that we might know the preliminary symptoms and postoperative history in those borderline cases whether the ovaries had been removed or left, in order that we might learn whether the ovary was really diseased or not.

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* For original article, see page 94.

REVIEW.

CONSERVATIVE GYNECOLOGY AND ELECTROTHERAPEUTICS: A Practical Treatise on the Diseases of Women and Their Treatment by Electricity. By G. BETTON MASSEY, M. D., Attending Surgeon to the American Oncologic Hospital, Philadelphia; Fellow and Ex-President of the American Electrotherapeutic Association; Member of the American Medical Association, etc. *Sixth Edition, thoroughly revised.* Royal octavo. 462 pages. Illustrated with twelve (12) original, full-page, chromolithographic plates and fifteen (15) full-page half-tone plates of photographs taken from nature, and numerous engravings in the text. Bound in extra cloth. Price, $4.00 net. F. A. Davis Company, publishers, 1914–16 Cherry Street, Philadelphia, Pa.

A perusal of this book would lead one to believe that there are few gynecological maladies that are not amenable to electric treatment. While electricity is no doubt of benefit in a very limited group of gynecological affections, we are not willing to concede that the indications cover practically the entire field of gynecology, as the author in this book avers. Indeed, we are willing to go so far as to say that the author's advice to apply electricity to beginning carcinoma of the breast or of the uterus, for instance, is positively pernicious. Even were the contentions of the author granted, in whole or in part, we deprecate the pretentious manner of exploitation of these doctrines, and especially his unreasonable and even puerile condemnation of operative surgery. Moreover, the knowledge of gynecology displayed in this volume does not appreciably inspire the reader's confidence in the author's contentions.

The author, like so many other advocates of specialized therapeutic measures, suffers from an utter lack of the sense of proportion. For this reason, his methods, we believe, would probably have obtained more adherents had his views been expressed in a more temperate manner. E. M.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Gangrene of Vulva, Vagina and Cervix After Abortion.—J. W. Markoe (*Bull. Lying-in Hosp.*, Dec., 1908) records the history of a II- para, twenty-two years of age, who began to bleed without apparent cause when about six months pregnant. Abortion occurred nine days later. No douches containing carbolic acid or other chemicals were used. On the day after the abortion was completed her condition resembled that of the third week of typhoid, but with subnormal temperature. There was moist gangrene of the vulva, vagina, and cervix and a small urethro-vaginal fistula. After removal of all gangrenous tissue, fresh-air treatment and extra diet were employed, and recovery took place within a month, complicated by cystitis and bed-sores. The writer has seen several cases of gangrene of the vulva in which no history of injury, either mechanical or chemical, could be obtained either from the patients or their friends, and yet in which the destruction of the tissues was very extensive. Decubitus has always been an accompanying feature, leading to the belief that an obstruction of the arterioles in the affected parts was caused by a thrombosis of these vessels or that the process was due to some obscure trophic disturbance in the central nervous system.

Difficulties of a Second Cesarean Section in the Same Woman.—A. Brindeau (*L'Obstétrique*, Jan., 1909) says that there are a number of operators who have done two, three, and even four Cesarean sections in the same woman. The operation is somewhat more difficult after the first time, since there remains a cicatricial line of tissue which must generally be excised so as to obtain a strong cicatrix when a subsequent operation is done. Hernias and eventrations are comparatively rare. Adhesions to the abdominal wall are more frequent, and sometimes simulate a ventrofixation. Generally they are very friable, but in some cases it is possible to enter the uterus without opening the peritoneal cavity, on account of the strength and extent of the adhesions. There may be considerable difficulty in incising the uterus, or it may be turned and its position changed. The uterine wall is sometimes so thinned over the old cicatrix that there is danger of tearing it, so that removal becomes necessary. Rarely the placenta is adherent to the cicatrix. These complications make the operation longer than a primary section. Intestinal adhesions are a serious complication at times.

Primary Ovarian Pregnancy.—Basing his opinion upon the findings at operation, J. A. MacLeod (*Amer. Jour. Surg.*, Feb.,

1909) reports a case which he considers one of primary ovarian pregnancy. Absence of the early signs and symptoms of pregnancy, the occurrence of rigors from time to time with concurrent alterations in the temperature and the pulse, the fetid odor to the uterine discharge and the presence of a large fluctuating, extremely sensitive mass to the left of the uterus made a diagnosis of pelvic abscess justifiable. Uterine scrapings, however, were found to consist mainly of large round cells, while smears and cultures from the uterine cavity were sterile. At the operation the intestines, the uterus, and left ovary were found to be all matted together in a mass. The adhesions were broken down and the parts defined as follows: The greater part of the mass was found to be a large cyst adherent to the upper and posterior surfaces of the fundus of the uterus, to an extensive area of a coil of the ileum, which was enlarged and very much thickened; the left ovary could not be made out, but the left ovarian vessels, very much enlarged, ran directly into the cyst wall. The left Fallopian tube was seen coursing over the surface of the tumor; it was apparently normal in every way. During manipulation the cyst wall ruptured and a thick, deeply blood stained fluid gushed out, and with it a small solid body, which proved on examination to be a fetus about one and one-half inches in length. The mass was found to consist of a sac wall, in which was situated a typical placenta. The placenta was two and a half inches in length, two inches wide, and three-quarters of an inch thick; intimately incorporated in it was the left ovary. The placenta derived its blood-supply from the fundus of the uterus, from the coil of the ileum and from the left ovary; its main supply was, however, from the left ovarian artery through the left ovary, as the active bleeding encountered early in the operation was controlled by the ligation of the left ovarian vessels. The Fallopian tubes were apparently normal.

Marriage of Women Having Cardiac Diseases.—Louis Rénon (*Gaz. des Hôp.*, March 18, 1909) says that the question of whether a woman having cardiac disease should marry is to be determined by the form and extent of that disease. Many women having well-marked cardiac disease pass successfully through a number of pregnancies. The question whether there are changes in the arterial tension and kidney condition is important. If there be constant alterations in the tension of the pulse, marriage should be avoided. The kinds of trouble to which woman are subject are two. Insufficiency of the heart is generally found in the earlier part of the pregnancy, about the end of the fourth month, when there are dyspnea and palpitation, sometimes ending fatally. Toward the end of pregnancy acute pulmonary edema may supervene, and the case may end fatally in a short time without delivery having been effected. In cases of cardiacs who have married, the pregnancy should be carefully watched, the urine examined frequently, and the general nutrition watched. After the fourth month all fatigue should be avoided and the patient should live a very quiet life. Labor, if slow, should be terminated by version or forceps. Hereditary arthritism and aortic lesions should contraindicate marriage for the sake of the offspring, who will probably inherit a tendency to these conditions. Cardiacs should not marry other cardiacs or relatives.

Treatment of Incoercible Vomiting of Pregnancy.—V. Wallich (*Ann. de Gyn. et d'Obst.*, April, 1909) gives the three classical diets in vomiting of pregnancy as, milk diet, water diet, and lactovegetable diet. Pinard advises the milk diet whenever we have the symptoms of autointoxication, only a small dose of milk being given at a time. If we find that these small doses are well borne, then the amount of milk taken is to be increased. If the urine increases, and vomiting ceases a cure is obtained; but in some cases even small doses of milk cannot be retained. We must then give only water, in small doses. This diet cannot be persisted in for more than four to eight days, since it is the diet of inanition. At the end of some days a small amount of milk is added to the water and the proportion of milk gradually increased. When the water diet is not well borne, all feeding by stomach must cease for twenty-four to forty-eight hours. Subcutaneous injections of serum are made at the same time to replace the water withdrawn from the system in the urine and feces. Another diet that has been proposed consists of farino-vegetable soups and purées, which produce no poisons, but these substances are not better borne than milk. Calming drugs must be given at the same time. Inhalations of oxygen lessen the number and severity of the vomiting attacks. If the urine increases in amount and vomiting ceases, all will be well. We must not wait too long while using these measures, but if they fail, should have recourse to the induction of abortion. When there is an acceleration of the pulse and fever, it is time to use obstetrical interference. In some cases the cause of the vomiting is uterine or ovular, and in these cases only abortion will do any good.

Role of the Placenta in Puerperal Eclampsia.—J. Meurice (*Ann. de la Soc. de Méd. de Gand*, vol. lxxxix, part 1), after examining all the theories of the production of puerperal eclampsia, especially that based on autointoxication, expresses the opinion that none of them satisfy the conditions except the one which holds that the placenta is the elaborator of the poisons which cause the convulsive symptoms. Eclampsia is divided into three periods: originally it is the placenta which elaborates poison; under the influence of this poison anatomopathological alterations occur in the liver, kidneys, spleen, and other organs; last of all comes a period in which excitomotor symptoms are manifested, which depend at first on the influence of the toxic product on the brain, and then on the labor which plays the part of a determining cause. In some theories sight seems to be lost of the fact that eclampsia is a trouble coexistent always with pregnancy or its sequelæ. The effect is taken for the cause. All is clear if we accept the placental origin of the poisons. From this organ the poison reaches all the other organs by way of the circulatory apparatus. The whole organism of the mother is introduced into a vicious circle; first, the placental intoxication; second, the functional troubles that arise from it. This theory accounts better than any other for the facts observed. Resting on exact scientific data and reliable experimental results, it furnishes a simple, logical explanation of the series of lesions and symptoms found, which contradicts all other hypotheses.

Treatment of Eclampsia.—W. L. Wallace (*N. Y. State Jour. Med.*, April, 1909) argues against violent methods in the treatment of eclampsia. He says that emptying the uterus is not an immediate cure-all; that the toxemia is not new or sudden, though the physician may have just discovered it, and that drugs like chloroform disorganize the liver and depress the patient who needs oxygen by artificial respiration rather than attempts to combat the one symptom, the convulsion. The production of more poison should be checked by emptying the uterus as rapidly as is possible without doing more harm than good. When treatment of convulsions seems necessary, the hypodermic use of morphine gr. 1/4 with hyoscine gr. 1/100 is best. If much edema is present, hot packs are particularly dangerous, as the sweating concentrates the poison in the body fluid. It should be diluted by adding saline solution to the blood, giving from one to three pints if used intravenously. The toxic substance should be eliminated by washing out the stomach and rectum, and by giving Epsom salts. Phebotomy may be done if necessary, and followed by intravenous injection of normal saline solution or by transfusion.

Renal Decapsulation in Puerperal Eclampsia.—J. Holliday Croom (*Edin. Med. Jour.*, May, 1909) reports a serious case of eclampsia in which recovery followed renal decapsulation after all other treatment had failed to cause improvement. The skin had acted freely, there was continuous action of the bowels, the kidneys themselves were acting fairly well, and yet the coma was becoming increasingly profound, the temperature was rising. The writer says that this operation should not be performed until labor is completed, as the symptoms so often subside at that time. The skin, kidneys, and bowels ought all to have been freely stimulated, and any of the other methods employed, such as saline injections, blood-letting, morphia, and thyroid as the necessity of the individual case may have suggested. The ideal case in which to perform decapsulation is one in which the other symptoms are accompanied by complete anuria, yet it is indicated in any case in which the kidney is obviously the organ most seriously implicated and in which the toxemic changes have not advanced too far. The passing of a normal quantity of urine of ordinary density is not enough;

far more is required under such circumstances, and decapsulation achieves this by relieving renal congestion.

R. C. Buist (*same*) records three renal decapsulations for eclampsia with two recoveries.

H. O. Nicholson (*same*) says that, in cases of eclamptic anuria occurring in women who have not previously suffered from nephritis and who in all probability have healthy kidneys, complete decapsulation of the organ is not necessary. The direct abstraction of blood by cutting freely into the organ at its lower border, should be sufficient to restore the renal circulation to its normal condition, and thus reestablish the secretion of urine.

Bacillus Aerogenes Capsulatus Infection Following Abortion.—E. B. Young and L. J. Rhea (*Bost. Med. Surg. Jour.*, Apr. 1, 1909) report two cases of puerperal infections with the bacillus aerogenes capsulatus because of the comparative rarity of this form of infection after labor or abortion. The bacillus aerogenes capsulatus is not normally found in the vagina, and in the great majority of infections with this organism it is introduced from without. The first case is noteworthy for the fact that a pure culture of the gas bacillus was obtained from the circulating blood during life. Clinically, the second case is interesting on account of the extraordinary extent of the cutaneous emphysema during life, and the high leukocyte count, 126,400; also in view of the possibility of an autoinfection, as she persistently denied any vaginal examination or attempt at criminal abortion.

Physical Culture of the Puerperium.—Of 291 mothers with gynecologic ailments, George Gellhorn (*Interstate Med. Jour.*, Nov. 1, 1909) found that 156 were sick ever since they had given birth to a child. In the overwhelming majority of these cases, the origin of their ailments could be traced back to a faulty management of the puerperium. A puerpera should stay in bed not less than eighteen days and should wear an appropriate bandage. Mild methodical exercises started in the second week after confinement, and continued for several weeks after the patient has left the bed, are indispensable to a complete restoration. Every puerpera should be examined carefully six weeks postpartum before she should be discharged from medical observation.

Appendicitis and Pregnancy.—C. O. Cooke (*N. Y., Med. Jour.*, May 1, 1909) says that appendicitis should be suspected in all cases of right-sided pain occurring during pregnancy. Inasmuch as constipation is an important factor in the etiology of the disease, the physician should see that the bowels are kept free throughout the pregnant state. The symptoms are often misleading. The prognosis is good in the acute catarrhal and chronic recurrent types, but extremely grave in the gangrenous, perforative, and abscess types. The treatment is operation in every case as soon as the diagnosis is established. In cases of doubt operation is safer than waiting. The mortality of appendicitis complicating pregnancy is the mortality of delay.

The true prophylaxis in a child-bearing woman who has had a well-marked attack of appendicitis is an interval operation. The possibility of appendicitis after labor in predisposed patients should be borne in mind in order not to mistake such for puerperal sepsis. In the perforative cases with general diffuse suppurative peritonitis, occurring at the end of pregnancy *accouchement forcé* is indicated, followed by incision and drainage of the peritoneal cavity.

Treatment of Labor in Contracted Pelvis.—F. Schauta (*Jour. Obst., Gyn. Brit. Emp.*, May, 1909) holds that our aim should be to leave labor in contracted pelvis as long as possible to the natural forces, and these failing, to perform only those operations which will most likely save both mother and child. The management of labor in contracted pelvis will shape itself in the following manner, provided it is carried out from the commencement in a skillful manner and in an institution under strict asepsis. In cases with a conjugate above 8 cm. there is a possibility of spontaneous birth, and therefore expectant treatment is to be adopted. In cases under 8 cm. Cesarean section is to be kept in view. In cases bordering on the above, that is with a conjugate of 8 1/2 to 7 1/2 cm. hebosteotomy is to be considered. This operation, in a conjugate of 8 to 8 1/2 cm., would be an alternative operation to spontaneous birth; in a conjugate of 7 1/2 to 8 1/2 cm., an alternative to Cesarean section. The choice would be determined by the size and hardness of head, the strength of labor pains, the voluntary efforts and general condition of the patient. This method of treatment should be looked upon in the future as typical. All other methods hitherto used in the treatment of labor in contracted pelvis should be looked upon as atypical. Craniotomy on the dead child may be indicated in a conjugate under 9 1/2 cm. Craniotomy on the living child may become necessary if the mother is in a state of infection or refuses to undergo any of the typical operations. Artificial induction of premature labor may also have to be performed in cases in which the mother is suffering from illness and Cesarean section or hebosteotomy at the normal term would be too dangerous, or where it is positively known that the children are abnormally large or the mother absolutely refuses an operation. The application of forceps above the brim and prophylactic turning should, if possible, be entirely removed from the list of methods of treatment in contracted pelvis. The application of forceps above the brim might exceptionally be tried before craniotomy on the living child is resorted to, and it will probably be possible occasionally to save a child. Before craniotomy on the living child is undertaken, prophylactic turning may be justified in certain degrees of contraction in a simply flat pelvis, when Cesarean section or hebosteotomy, on account of illness of the mother, is out of the question, and a trial with the forceps affords little hope of success on account of the high position and mobility of the head. Forceps above the brim and prophylactic turning will find their indication in such atypical cases as a last attempt to save the life of the child before craniotomy is resorted to—forceps when the head is fixed, turning when it is movable. In a conjugate under 6 1/2 cm., Cesarean section is absolutely indicated: if the case be aseptic, with suture of the uterus; if septic, with total extirpation or supravaginal hysterectomy.

GYNECOLOGY AND ABDOMINAL SURGERY.

Lecithin to Regulate or Retard the Menses.—Henri de Wilczinsk (*Semaine Médicale*, No. 14, 1909) advises the use of lecithin to retard the menstrual flow when it occurs too often or is too profuse. He uses 0.10 to 0.20 grams three times a day between the menstrual periods. It is especially useful in anemia when the periods are too close together. The author reduced the menses to once in three weeks when they had been appearing once in fifteen days. When menstruation is too abundant it may be retarded a week. The prolonged use of lecithin causes no inconveniences.

Hyperemic Treatment in Gynecology and Obstetrics.—After briefly reviewing some of the recent work in hyperemic treatment, A. Stein (*Jour. Amer. Med. Assn.*, Jan. 23, 1909) says that in connection with artificial hyperemia, it is all important to treat the patient's general condition. It is the aim of the hyperemic treatment to increase the flow of blood through the diseased tissue in order that the latter may better resist the deleterious invasion of bacteria. This will be the more easily accomplished if the blood is in good condition, and, therefore, hygienic, dietetic, and tonic treatment should not be lost sight of. The hot-air treatment, alone or combined with *Belastungslagerung*, prolonged pressure upon the pelvic exudate by weights upon the abdomen and within the vagina, is of great value in the treatment of chronic inflammatory conditions in the female pelvis and the cupping of breasts is a valuable aid in treating puerperal mastitis and breasts which secrete poorly or not at all. The writer believes that the general practitioner should familiarize himself with these forms of treatment, and that hospitals should do justice to the progress of medical science by establishing so-called "conservative wards" in which the treatment can be given a thorough trial. If this be impossible, special rooms should be established in gynecologic dispensaries for this purpose. Thus many women would be cured who now are but slightly improved or mutilated by operative treatment.

Influence of Ovarian Secretion on the Mammary Glands.—L. Bouchacourt (*Jour. de Méd. de Paris*, Mar. 13, 1909) has studied the correlation between the mammary glands and the ovaries, which presents an important example of the interrelations of various organs in the body. He concludes that the appearance of mammary changes at puberty occurs under the stimulus of the ovarian secretion. Later in life the ovaries seem to secrete some principle that is unfavorable to mammary secretion. Facts that support this view are the following: insufficiency of the ovaries accompanies hypertrophy of the mammary glands of pathological nature; there is a relative repose of the ovaries during pregnancy while the breasts are increasing in size; ovarian removal during absence of lactation produces increase in size of the mammary glands; a natural menopause may produce the same symptom; pregnancy during lactation has an unfavorable influence on lactation; ovarian castration during lactation increases and prolongs lactation; menstruation during lactation diminishes the secretion. Practical deductions from these facts are these: the nursing woman should be kept in a condition of sexual repose; the appearance of menstruation will indicate a near approach of the end of lactation. At the menstrual period the woman should receive supportive nutrition, and the infants should receive the bottle in place of some nursings. When pregnancy intervenes in the course of lactation, it is an indication for the beginning of feeding and the gradual stopping of nursing.

Aseptic Sloughing of Uterine Fibromyomata.—B. Auché and R. Brandes (*Jour. de Méd. de Bordeaux*, March 7, 1909) think that we should distinguish between septic sloughing of uterine fibromyomata, caused by bacterial invasion, and aseptic sloughing, which arises as a result of circulatory changes in the tumor. They have made careful microscopic examinations of four tumors which had been removed, both examining sections and making cultures to find out if microorganisms were present. They found that degenerative changes began in the fibrous nodules in the interstitial tissue about the blood-vessels, resulting in circulatory changes. These lesions differ widely from those produced by microbic invasion.

Red Degeneration of Uterine Fibromyomata.—From a study of five cases of this condition, J. L. Smith and H. F. Shaw (*Jour. Obst., Gyn. Brit. Emp.*, April, 1909) conclude that the chief change found in "red degeneration" of fibroids consists in thrombosis of the blood-vessels. This thrombosis and red coloration may commence at the periphery of the tumor. The tumors are also in a state of degeneration as evidenced by a homogeneous material separating the muscle bundles in many places. They contain fat and fat crystals, probably derived from the breaking up of the muscle bundles. They are liable to become infected by septic organisms and so give rise to acute toxic symptoms. Pregnancy is probably a predisposing factor in the causation of this condition.

F. E. Taylor (*Clin. Jour.*, April 28, 1909) believes that red degeneration of fibromyomata occurs as the result of thrombosis of their blood-vessels in only a minority of cases, for it was present in only a few of the thirty specimens of red degeneration which he has examined, in one or two cases being also accompanied by extravasation of the red blood-corpuscles among the tissues of the tumor. In the majority of the specimens neither thrombosis nor hemorrhagic extravasation could be observed. It is concluded that red degeneration of uterine fibromyomata is an aseptic necrobiosis of the tumor cells associated with a diffuse staining of the tissues with hemoglobin, due to some local disturbance of nutrition in which pregnancy often, but by no means invariably, plays a part.

Death of Unexposed Interstitial Fibromata.—P. Begouin (*Jour. de Méd. de Bordeauz*, April 25, 1909) describes a condition of death of interstitial fibroids which are not in contact with the air and in which there is no opportunity for infection. The name gangrene should not properly be applied to such a condition. The author believes that it is entirely aseptic, the bacteriological examination of such growths having shown the presence of no bacteria. The condition is caused by thrombosis of the vessel supplying the fibroid. Examination of the circulation of such fibroid nodules has shown that there is only a single artery supplying each nodule, and this artery is derived from the uterine artery. The blocking of this single artery will cause death of the fibroid, and this will undergo an aseptic degeneration. The author gives illustrative cases.

Fibromyoma of the Uterus Complicated by Cancer or Sarcoma.—In a series studied by Ellice McDonald (*Jour. Amer. Med. Assn.*, Mar. 20, 1909), the total number and percentage of malignant complications of 700 fibroid tumors were thirty-five cases (5 per cent.), including twenty of adenocarcinoma, six of squamous carcinoma, seven of sarcoma, and two of chorioepithelioma malignum. Of these thirty-five cases, twenty-seven cases (those of adenocarcinoma and sarcoma) were due to or influenced by the presence of the fibroid tumor, while eight cases (those of squamous carcinoma and chorioepithelioma malignum) were of accidental association, that is, their occurrence was not influenced by the presence of fibroid tumor. There was but one case of malignant complication, a squamous carcinoma, in a patient below forty years of age; with each decade after forty the percentage of malignancy increased markedly, being 5 per cent. in the fifth, 12.7 per cent. in the sixth, and 23.8 per cent. in the seventh. In view of this large percentage of occurrence of fatal disease among patients having fibroid tumors, and the great increase of malignant complications after forty years of age, a physician should advise all patients who have fibroid tumors and are over forty years of age to have these growths removed; for, if the fibroid is not removed, the probabilities are that malignant change will result in one case in every twenty between the ages of forty and fifty, one case in every eight between the ages of fifty and sixty, and one case in every four between the ages of sixty and seventy.

Calcified Fibromata.—Pinard (*Bull. Méd.*, April 21, 1909) describes a case of uterine fibroid which had caused eighteen years of sterility, and after the menopause, at the age of sixty-eight years, caused hemorrhage. A part of that hemorrhage effusion being retained within the uterus, which was displaced by the calcified fibroid, it became infected and caused symptoms of septicemia. Examination showed a hard tumor filling the pelvis, which consisted of a calcified fibroid, having only a thin shell of fibromuscular tissue around it. According to this author, the fibroid is a parasite which is never observed before puberty or after the menopause, except when it has existed during genital life. He believes that these growths result from the nonfertilization of ova and sterility. They occur only in women who do not conceive. The prophylactic treatment recommended is that every woman should be impregnated before the age of twenty-five. Each fibroma arises around a single capillary. Microbic action has nothing to do with it. The endothelial cells of the capillary remain intact, while the adventitia develops embryonal cells. Under the influence of an unknown force these cells change and differentiate, becoming muscular. These muscle cells may develop into connective tissue and fibroid elements. Fibromata never give symptoms except from pressure on the other organs contained in the pelvic. They never undergo cancerous degeneration, but may become fatty or calcareous. In some cases phenomena of necrobiosis develop. In gestation they may soften or remain stationary. If the growth is already fibrous, it remains stationary during pregnancy. If it is still soft, lactation may cause retrogression and involution. Pinard believes that the ordinary means of treatment of fibroids are useless. Electricity has not given him good results. He uses simply hot douches of six to ten liters of water at 50° C. twice a day.

Action of the X-rays on the Genital Organs.—Paul-Charles Petit (*Gav. de Gyn.*, March, 1909) states that there seems to be no doubt that the male organs can be sterilized by the use of the X-ray, but only temporarily. Therefore there is no danger to them in its use, but we should take care to protect the genital organs of all operators in X-ray work, as well as patients treated for other than genital troubles. As to the female organs we must remember that a woman is born with a fixed number of ovules. The rays can diminish the number of these structures in the ovaries, and they cannot be again increased. We do not know what effect on the coming generation may be caused by the use of X-rays applied unskillfully to the male genitals. Monsters may be produced in the next generation. The use of the rays should be restricted to experts, and those who would like to use them for criminal purposes should be prevented from having that opportunity. The deep location of the ovaries prevent their being easily affected when the rays are used in ordinary medical applications. The X-ray should not be considered a sort of panacea, a last resort for the incurable, but should be used early in cases in which it may be of value.

Intraabdominal Use of Oxygen.—Adding fourteen cases to those previously reported by himself, W. S. Bainbridge (*Ann.*

Surg., March, 1909) concludes that final deductions concerning the clinical value of oxygen administered intraabdominally cannot be made as yet. It may be said, however, that oxygen, intraabdominally administered, has a distinct field of usefulness in lessening shock, hemorrhage, nausea, and vomiting; in overcoming negative intraabdominal pressure after removal of large tumors; in preventing the formation of adhesions, or, when broken up, lessening the liability of their return; and in influencing favorably certain types of tuberculous peritonitis. In these cases in which the gas was introduced into the peritoneal cavity in septic peritonitis, sufficient beneficial effect was noted to warrant the hope that further clinical experience may establish the efficacy of the gas as an adjuvant in the treatment of this condition.

Genital Tuberculosis in Woman.—C. Lenormant (*Prog. Méd.*, March 27, 1909) describes tuberculosis of the genital organs as a rare, and generally a secondary complication of tuberculosis in some other part of the body, often the lungs. In 3 per cent. of cases of laparotomy done for gynecological troubles, a tuberculous condition is found. As a primary condition, tuberculosis of the genitals may result from infection during intercourse from the tuberculous genitals of the male. Generally it is a descending, circulatory affection. Tubercle bacilli may be contained in the semen. They will infect the vagina only when there are lesions of the mucous membrane. Any part of the genital organs may be attacked by tuberculosis. It is rare where pavement epithelium protects the mucosa, as in the vagina, vulva, and cervix, more frequent in the fundus, tube, and ovary. In vulva and vagina it may consist of an ulceration, an infiltration with many follicles and giant cells, or form a tumor simulating sarcoma. On the cervix it forms cauliflower growths of a bright red color in contrast with the pale mucous membrane. In the body of the uterus it is relatively frequent, localized in the mucosa, and accompanied by a chronic glandular endometritis. In old women with occlusion of the uterine os there may be distention of the cavity by the vegetations and pyometra. Diagnosis is almost impossible in this location. In the ovary it generally accompanies the tubal form. The organ is enlarged, knobbed, hemorrhagic, and there may be a true cold abscess of the ovary. When the tube is involved the peritoneum is generally also involved. In the chronic fibrous form it is curable spontaneously. When caseous the closed tube may contain pus and detritus. Here operative interference becomes necessary. There is little except the family or personal history of tuberculosis to assist in the diagnosis of tubal tuberculosis from the ordinary chronic form. There is a slow evolution, without much pain or fever. Tuberculous pelviperitonitis may be cured spontaneously or by the simple exploratory laparotomy. Surgical interference is generally necessary in all forms of tuberculosis of the genitals, in addition to the general antituberculous treatment.

DEPARTMENT OF PEDIATRICS.

SYMPOSIUM ON SUMMER DIARRHEA.

SOME FACTS REGARDING BROOKLYN'S SUMMER INFANT MORTALITY.[1]

BY
LOUIS C. AGER, M. D.
Brooklyn, New York City.

(With one chart.)

As this paper is almost a matter of statistics, and as the preparation of statistics means a large amount of time, I wish to express my thanks to Miss Bruere, of the Charity Organization Society, and Dr. Guilfoy, of the Health Department, and Miss Howe, of the *Delineator*, for their assistance.

There are two classes of facts—those that relate to summer infant mortality in all large cities and those that relate specifically to Brooklyn in comparison with other cities.

TABLE I.

DEATHS, 1907.

Total	74,041
Total under five years	24,037
Diarrhea under five years	6,060
Measles	718
Scarlet fever	742
Diphtheria	1,614

New York compares favorably with other large cities here and abroad in same climate. Therefore Table I gives a fair idea of the general facts. Of the total number of deaths those under five years are as 1 to 3. From diarrhea under five years, the ratio of deaths is as 1 to 4, and equals nearly twice the combined deaths at all ages from measles, scarlet fever, and diphtheria. Nearly all the deaths from diarrhea are under two years.

Table II shows in a general way what we all know, that a large majority of these deaths from diarrhea occur during a few weeks of hot weather.

Table III indicates that various agencies are at work combating the conditions shown in the other charts.

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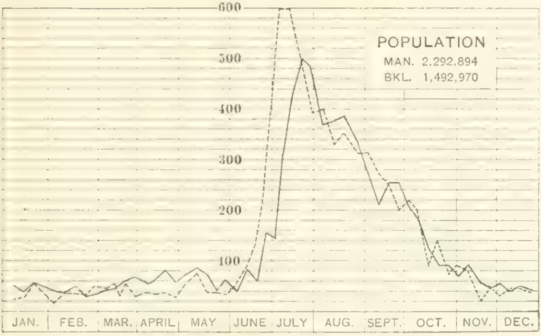
[1] Symposium on Summer Diarrhea, read before the Kings County Medical Society, June 15, 1909.

TABLE II



Death rate from diarrheal diseases in those under five years of age in the Boroughs of Manhattan and Brooklyn in 1908. Rate is shown by weeks per 100,000 of population. Black line represents Manhattan; broken line Brooklyn.

TABLE III.

Philanthropic agencies	Old New York	Brooklyn
Fresh air organizations	144	10
Number of children one or two weeks in country	31,000	6,500
Number of children day parties in country . .	110,000	10,000
Number of day nurseries	55	13
Milk distributing agencies	3	1
Milk distributing agencies open	twelve months	three months
Number of babies fed daily	2,800	. . . . . .
Number of babies fed during season	. . . . . .	2,296
Number of days' feedings distributed	950,000	50,000
Number of child nurses	28	2
Number of general nurses	160	20
Number of dispensaries	60	17

Table IV shows that there has been a steady improvement in the conditions; and by going further back the facts would be more striking. For example, in 1882, the rates were, respectively, 3.32 and 3.44. This change is especially striking when we consider that in the last ten years the foreign population has been a much greater incubus upon city progress and much more difficult to assimilate than ever before.

TABLE IV.

DEATHS FROM DIARRHEA.

	New York	Brooklyn
1894	2.28	2.69
1896	2.16	2.41
1898	2.10	2.57
1900	1.80	2.31
1902	1.52	1.77
1904	1.66	1.83
1906	1.57 (Combined)	

As members of the medical profession we are interested in the various facts already presented. Still more, however, as representing the medical profession of Brooklyn, ought we to be interested in the facts that pertain exclusively to Brooklyn. I know that I have acquired the reputation of being a crank upon this subject, but I do not think that I attach too much importance to it.

This is, however, an age of puericulture in all its branches, and I want my native city to be a leader, not a follower in all such good work.

GENERAL FACTS OF COMPARISON.

(*a*) The ratio of population between the boroughs of Brooklyn and Manhattan is as 2 to 3.

(*b*) Although Brooklyn has had for some years a great foreign population, there is no question but that the foreign population of Manhattan is more densely crowded and probably of a little lower social status.

(*c*) In Brooklyn the area is greater, and the population, therefore, less crowded, and we have large surrounding areas to which people can go quickly to get out of the crowded part of the city.

These facts ought to make Brooklyn a more healthful place than Manhattan. On the other hand, we have in Brooklyn more old private residences which have been converted into tenements, and, although they contain fewer families, they are undoubtedly more unsanitary than the large double-deckers or modern construction in Manhattan.

Referring to Table V, we see that extending over a period from 1903 to 1907, there is a percentage difference in favor of

Manhattan of a little less to a little more than 1 per cent. In 1907, for example, there is a difference of 1.1 per cent.

TABLE V.

	Total deaths		Diarrheal deaths under one year		Per cent.		Annual death rate	
	Old N. Y	Bkln.	N. Y.	Bkln.	N. Y.	Bkln.	N. Y.	Bkln.
1903 .	41,770	22,192	2,258	1,238	.054	0.55	18.57	17.27
1904 .	48,743	24,831	2,762	1,642	.057	0.66	21.02	18.83
1905 .	45,199	23,939	2,872	1,656	.063	0.69	18.91	17.57
1906 .	46,108	25,024	2,774	1,856	.060	0.74	18.71	17.82
1907 .	47,698	26,043	2,990	1,923	.062	0.73	18.51	17.98

Returning to Table II, in comparison of Manhattan and Brooklyn, it is to be noted that the weekly deaths from diarrheal diseases under five years of age in Brooklyn ranged from about fifteen during the cold months to the highest point of 173 during the first week in July. In other words, the highest point is over twelve times as great as the average for the cooler months. Whereas, in Manhattan, the average increase is only about ten times as great.

On the other side of the question, the facts in regard to the question of philanthropic work done among children are very suggestive when considering infant mortality. Not only are there 144 fresh air organizations in Manhattan (see Table III) as compared with ten in Brooklyn, but many of the Manhattan organizations are far larger than any of those in Brooklyn. Moreover, this great number of foci for the education of the tenement-house population is greatly to the advantage of Manhattan; although some of these agencies do not deal directly with children, even those which take convalescents or working girls or working men to the country for a short period indirectly improve home conditions through education and by the financial relief presented.

One of the most useful means for the education of mothers is to be found in the day nursery. In Manhattan there are fifty-five day nurseries, whereas in Brooklyn there are but thirteen. Aside from the figures, it is undoubtedly true that many of the nurseries in Manhattan take charge of a very much larger number of children than any of those in Brooklyn, and they are probably doing in many instances much more systematic educational work.

In all this comparison, it must be borne in mind that the benefit secured is not merely the welfare of the comparatively small number of the population directly cared for, but that the educational influence is of many times greater value.

These figures do not deal with the summer corps of the Health Department, and we have every reason to expect that that work will be far more efficient in both boroughs during the present summer than it ever has been before.

Finally, we have in diarrheal summer infant mortality the ideal point of attack for reducing the general death-rate, aside from any special interest in the children themselves.* In other words, citizens with any active civic pride in this borough could find no more telling way of getting results than by concentrating upon this one very black spot—summer infant mortality. I would again emphasize the facts that:

1. This mortality is largely preventable.
2. It constitutes a very considerable part of the total mortality.
3. It is largely concentrated in a short period of three months.

160 State Street.

PREDISPOSING CAUSES AND PREVENTION OF SUMMER DIARRHEA.

BY
JOHN W. PARRISH, M. D.,
Physician to St. Christopher's Hospital, Brooklyn.

EVERY influence that lessens an infant's health and strength, whether acting after birth or during intrauterine life, is a predisposing cause of summer complaint. Birth from diseased or feeble parents may be an important element; either because of direct inheritance of disease, as syphilis, or because of defective nervous system from alcoholism in parents, or because of a lack of general vigor.

General diseases, tuberculosis, syphilis, rachitis, and many diseases of special organs, tend to produce malnutrition with its impaired power of resisting depressing agencies.

It must be kept in mind that in a very great majority of instances death does not occur from an acute attack of summer diarrhea in a previously healthy child. A healthy child may indeed succumb to that type of disease to which the term "cholera infantum" is now applied, which is probably a special infectious disease or is due to the taking of food in which toxins are already present in large amount. So also an acute ileocolitis may be severe enough to carry off a strong child. As a rule, however, the infant who dies of gastroenteric disease in summer has suffered from malnutrition for a longer or shorter period before its fatal illness began.

This malnutrition may be due, as has been said, to any one of many diseases; it may be and very often is, in part at least, due to insufficient out-of-door air; it may occur in breast-fed babies from too frequent or overfeeding, or from abnormal breast milk; but it is most commonly due to the chronic digestive troubles of bottle-fed infants and these in turn are caused by food, improper in amount or time of administration. Improper because contaminated by foreign matter of various kinds, or improper because too weak to nourish the child or too strong for the child's digestion. Very frequently with the mistakes of feeding goes the mistake of too little fresh air. At St. Christopher's Hospital for Babies we have had in the past twelve years many cases of gastroenteric disease and many deaths. I certainly am within the bounds of truth when I say that not 5 per cent. of the deaths due to diseases of the digestive organs resulted from an acute attack in previously healthy babies.

Those of you who have done pediatric work in dispensaries will recall the great frequency of chronic digestive troubles antecedent to the acute outbreaks occurring in hot weather. Very often the mother or a neighbor will have treated the earlier symptoms with castor oil and obtained temporary relief; or, much worse still, the mother will have allowed the baby to suffer for many weeks from vomiting and diarrhea, under the delusion that teething was the cause and nothing could be done.

A common history is about as follows: While the baby was breast-fed it did well, but soon after the commencement of bottle-feeding it developed vomiting, pain, and diarrhea or constipation, and these symptoms have continued more or less. Another frequent history is that the baby did fairly well on the bottle until it had a rather severe attack of vomiting and diarrhea from which it apparently recovered, but it never had good digestion since that time.

The problem, then, of cutting down Brooklyn's high mortality in summer is not only that of curing summer complaint, so called, but of giving the babies sufficient digestive power and general vigor to prevent them being excessively liable to acute attacks during the hot weather. In theory this is very simple and may be summed up as follows: proper clothing, an abundance of fresh air, and suitable food.

As to the Clothing.—The common fault is too much clothing. We often see these babies swathed in a half-dozen layers of woolen and other garments because the mother fears a chilling of the skin. The abdomen and feet should always be kept warm, but the child's body must not be wet with perspiration.

Fresh Air.—The cold-air treatment of tuberculosis and pneumonia is helping to educate the laity, but there is great need of further instruction along this line. Among the poorer classes the mother often keeps the baby in the kitchen while she does her work. There is a hot fire in the stove and the temperature of the room is 75° to 80° F. Among the well-to-do it is no uncommon thing to find the temperature of the nursery at 75° F. or higher. The temperature of the nursery should be 68° F. in the daytime and about ten degrees cooler at night.

In summer, when not out of doors, the child should be in the largest and coolest room in the house, and on very hot days may have a couple of cool baths. In some of the difficult feeding cases it is impossible without the tonic of fresh air to secure a digestion vigorous enough to permit the child to thrive.

What Dr. W. P. Northrup calls the "twenty-three-hour treatment" accentuates the importance of out-of-door air. By this he means keeping the baby in fresh air twenty-three hours out of the twenty-four, the other hour giving time for the necessary changing in a warm room.

Of course, the child must not be in a draught, and it must have sufficient clothing to keep it comfortable. While teaching the mothers the necessity of fresh air, we, as physicians, should use our united influence to compel tenement-house builders to so construct their buildings that out-of-door air is a possibility to a child while in the house.

The crowded tenement, impossible of ventilation, should be abolished.

Suitable Food.—Now the most important of all things in the prevention of gastroenteric disease in summer is good digestion, and to secure it we must give proper food. As the result of the work of our milk commission it is now possible in Brooklyn to obtain the very best quality of milk, certified milk, at no great expense. Another result of the milk commission's work is that more care is taken in the production of noncertified milk. It should be a source of gratification to the entire profession that such marked progress has been made in the problem of supplying a good clean milk.

There remain two very important problems in connection with infant-feeding, and when they are solved the excessive infant mortality of summer will disappear. The first is the devising of some simple rules for adjusting the food to the digestive requirements of infants—not infants in general, but to the particular needs of the individual infant.

The second problem is that of teaching the mothers, especially among the poor, how to carry out simple directions for the preparation and preservation of their babies' food.

Now, as there is no food as good for the child as mother's milk, we should insist that every mother must nurse her child if able to do so, anything else is gross negligence of duty on our part.

When we attempt to use cow's milk we find a medium about as different from human milk as it could be and still be milk. The proteids of cow's milk are about double those of human milk, and the ratio of casein to albumen is about five to one instead of one to two. Rotch and Morse state in a recent paper that there is no proof of a qualitative difference in the proteids of the two milks. The fats are present in about the same amount in the two milks, but they differ qualitatively. Milk-sugar makes about 4 1/2 per cent. of cow's milk, and about 7 per cent. of human milk. The mineral matter of cow's milk is about four times that of mother's milk, but it contains less chlorine—hence the necessity of adding a little table salt to our food mixtures, as taught by Jacobi many years ago.

The aim of the American pediatrist has usually been to so modify cow's milk as to make it closely resemble mother's milk. This, in my opinion, has unnecessarily complicated the problem of infant-feeding. For though we can duplicate mother's milk as far as percentages go, it still remains an imitation mother's milk, and it doesn't fulfill the function of mother's milk.

When it was found that this modified milk often failed to digest and that there were many curds in the stools, it was thought that the casein was at fault, and to remedy this the proteids were reduced to a very low point—1 per cent., 1/2 per cent., or even lower—the deficiency being made up by comparatively large amounts of fat and sugar.

As this plan wasn't altogether successful, attention was directed to the fats of cow's milk, with the result that it has been claimed by some writers that the curds were of fatty origin. Southworth and Schloss have published some very careful studies of the composition of curds, and they show that the large firm curds are much the same as curdled milk anywhere else, that is, they contain both casein and fat. The smaller softer curds contain more fat, but also contain protein. The very smallest grayish-looking curds they found to be calcium soaps.

However, it is becoming more and more an accepted belief that the fats are a prominent factor in causing indigestion among the bottle-fed. Fischl, in Pfaundler and Schlossman, quotes Czerny and Keller as attributing most of the bad results of milk feeding to excessive amounts of fat. The fact that obstinate indigestion occurs where too much fat is given is a matter of common observation, and the fact that in the most severe cases of malnutrition or infantile wasting, we usually have to give a food that is practically fat-free, points to the accuracy of this belief. The trend seems distanctly away from the use of high-percentage creams as the basis of our food mixtures. It is half a dozen years since I have used anything stronger than the top pint milk, which, as you know, contais about 7 per cent. fat, and I now believe we should in the beginning use whole milk as the basis of the food and only gradually work up to the top pint milk. After reaching a point where the child takes top pint milk in one-half strength, we should gradually return to whole milk, using first two-thirds whole milk and then three-fourths whole milk, diluted usually with barley or oat water; that is, we should use the cereal if the child is much over six months old. Most babies do not readily digest undiluted whole milk during their first year, andnot very rarely it causes indigestion during the second year.

The return to the use of whole milk is a distinct advance, in my opinion, first, because it tends toward simplicity, a very important thing; and, secondly, it gives the child a chance to gradually acquire the power of digesting cow's-milk fats. A rule that I think is of the utmost importance is to begin with a food weak enough for the child's digestion and increase the strength as needed, rather than to begin with a food that a child of any particular age ought to digest, but may very likely be unable to do. I know of no more unsatisfactory proceeding than that of gradually scaling down the percentages of a food that is causing indigestion, for it seems as if the more one weakens the food the less power of digestion the child exhibits, and finally one is down to a very weak food and yet hasn't helped the indigestion.

When all is said and done, it is cow's-milk fat and proteids that the baby is going to live on, and we must teach it to acquire the necessary digestive power, proceeding as in teaching the child anything else; that is, give a very easy task at first and increase the work as the capacity for work grows.

There are babies, especially those with long-standing indigestion, who cannot be fed satisfactorily on whole milk or top-milk dilutions. Before giving up these plans there are two measures that should have a thorough trial—daily lavage and keeping the child in out-of-door air practically all the time.

Having failed with cow's-milk feeding, probably the best plan is whey-and-cream feeding, with which the name of Dr. Elias H. Bartley is naturally connected. By the whey-and-cream method we alter the relative proportions of casein and albumin and get a mixture more closely resembling mother's milk. This method lacks the simplicity of the first method and has the disadvantage that to many babies it is laxative in its effect.

This latter becomes a distinct advantage in certain cases. The simplest way of using whey and cream is to make the whey from skimmed milk, thus getting a mixture containing nearly 1 per cent. protein, about 4 1/2 per cent. milk-sugar, and about 1/3 per cent. fat. To this we add fat as needed, heating the whey to 150° F. before adding the cream to prevent the rennet ferment curdling the casein of the cream.

Sometimes it will be necessary to try still other methods of feeding. Buttermilk or artificially soured milk is at times very useful; condensed milk diluted 1 to 20 is often serviceable in stopping persistent vomiting and diarrhea due to indigestion.

Another plan is to make use of a cereal diluent, even at a very early age. I have frequently seen it successful at three months and have known babies to be successfully fed in this way right from birth. In whatever way the baby is fed, it is of the utmost importance that the mother report at stated intervals so that the child may be kept under continuous supervision.

Teaching the Mothers.—Until the past few years very little had been done in the way of instructing the mothers at their homes. Much pasteurized milk has been given away and many lives probably have been saved, but this plan doesn't get at the root of the matter. The mother who is given milk for her baby this summer, needs it again next summer, and so on indefinitely. Recently the attempt has been made to teach the mothers something about the care of their babies' food by visiting nurses who go to the homes.

In Manhattan the Department of Health and many hospitals and dispensaries employ nurses to do this very important work. In Brooklyn, except for the work of the Department of Health, so far as I know very little has been done. Dr. Ager by his own efforts has secured the services of a nurse to visit from a dispensary, and we now have a nurse for this work at St. Christopher's Hospital. What is really necessary is that each hospital and dispensary for babies have one or more nurses who can go to the homes and actually show the mothers what they should do. In detail, the nurse should teach the mother the necessity of clean milk; that grocery milk, so-called, is a dangerous thing; that perfect cleanliness of all utensils, including bottles and nipples, is absolutely essential; that the refrigerator must be clean and kept at a temperature of 50° F.; that the milk should never leave the refrigerator, except for the short time necessary for its preparation, until it is taken out for the child's immediate use; that pasteurization is necessary in summer; that the child itself must be kept clean; that fresh air is a necessity for its healthy growth; that she must report at stated intervals to the dispensary, where the child should be weighed and a record kept.

In conclusion, the predisposing causes, aside from general diseases and inherited weakness, are unsuitable food and want of out-of-door air.

High infant mortality in summer can only be prevented by attention to the child's nutrition throughout the entire year. No fight against disease in summer alone can be more than partially successful.

When the gospel of fresh air has thoroughly permeated the medical profession and the laity, we will get a rigid enforcement of good sanitary building laws, and fresh air will be a possibility for all.

When we have so simplified our rules for feeding babies that one of only moderate intelligence can carry them out, and when the mothers have been taught the simple rules for the care of their infants' food, the millenium for Brooklyn babies will not be so far distant.

111 MONTAGUE STREET.

THE HYGIENIC AND DIETETIC TREATMENT OF "SUMMER DIARRHEA".

BY

LEGRAND KERR, M. D.,
Visiting Pediatrist to the Methodist Episcopal (Seney) Hospital; the Williamsburgh Hospital, and the Swedish Hospital in Brooklyn, N. Y.
Brooklyn, N. Y.

WE would not conform to the purposes of this symposium if our intense interest in this subject was the means of leading us to consider even briefly the evolution of our knowledge of the various phases of this whole question. The question of age incidence, however, is in part within the realms of this paper. We know that the probability of attack is very small under the age of three months, but from this period there is a rapid increase until the age of two years is reached, and the greatest mortality is during the last nine months of the first year of life. This covers the period during which the hygienic and dietetic care of the infant is most difficult. I am not unmindful of those infants who come into the world unprepared for the usual exigencies of infantile life; those infants who are prematurely born or with an inferior physical equipment.

But as I understand it, we are to deal with that large class of infants of normal development who are early but preventable victims of diarrheal disease.

In the hygienic and dietetic management of these cases, the relative importance of the four chief etiological factors must be remembered. These are the soil, the season, the food, and bacterial infection. Insanitation in its broadest sense favors the disease; therefore density of population or dwellings upon an unclean soil; insufficient sunshine, defective ventilation, maternal neglect, contaminated food; all must be considered.

The influence of the character of the soil, I believe, is a very decided one. A soil which is loose is one upon which infantile diarrheal mortality is likely to be high, and this influence is enhanced if the soil is polluted. Where the dwelling houses of any particular town have been built upon a foundation which is largely of rock and where there is little loose material upon the surface, the mortality from diarrhea is proportionately low, in spite of the existence of other factors which are not favorable to the infant.

This, I believe, is one of the important if not one of the chief reasons why the infantile diarrheal mortality is less in the borough of Manhattan than in the other four boroughs. Manhattan Island is nearly all rock; its formation makes the matter of the prompt and efficient disposal of sewage into the Hudson and East Rivers a matter of comparative ease. Here, then, are two elements in which Manhattan has an advantage; suitable soil and efficient sewerage.

A third and very important element is the fact that its agencies for the care of small children are so numerous and efficient that sick infants are quickly sent away from the borough and are placed in the best possible surroundings for recovery. But, on the other hand, if these infants die, the mortality is not counted against Manhattan, but against the place to which they are sent. Richmond borough is a favorite point to which such infants are sent, and its mortality, therefore, is correspondingly high.

Because of the proximity of all the boroughs, we may disregard the matter of season further than to state that whatever its mode of action may be, a deficient rainfall in the summer season tends strongly toward the occurrence of the disease.

That there is a certain relation between the temperature and diarrhea is usually accepted, but how does this operate? There is a diversity of opinion because of the scarcity of facts.

Some hold that by prolonged high temperature the sensitive system of the infant is depressed and, therefore, it is more susceptible to disease.

Such a proposition is untenable when we consider the health of the infants in tropical climates and in the warmer portions of our land and recall the fact that the most easily depressed infants, those under three months, are practically immune from any except the most virulent infection.

Others claim the existence of a "miasm" dependent for its development upon prolonged high temperature. But this form of diarrhea is one largely of city life. Therefore, we have a condition of soil sealed by concreted streets, a superior system of drainage, both of which militate against such a proposition. And, further, if a "miasm" exists, why does it favor females and show its greatest virulence against those infants between the ages of three months and two years?

Now, what real facts have we to help us?

1. We have a disease which mainly affects the alimentary system. The clinical phenomena of convulsions, prostration, hyperpyrexia, etc., are simply secondary or reflex.

2. It is not due to trauma, although trauma may be present as a late result.

3. It is in no sense a constitutional disease.

4. It is a straight out and out infection of the alimentary canal.

5. It is most prevalent during the first two years of life.

Every one of these facts is consistent with the proposition that the disease is due to a contaminated food and particularly a fluid food.

Then how does temperature operate on the food? A prolonged high temperature favors the growth of infective bacteria and processes of decomposition. Milk, which is the chief article of diet of many infants, offers a suitable nidus as far as moisture and pabulum are concerned, and if the temperature be raised the third favoring condition is established.

But irrespective of direct effect upon the milk, a prolonged high temperature favors the collection of dust and, therefore, its introduction into and upon food, and each particle may be the aeroplane for some organism. When we experience a prolonged high temperature with little moisture, we are also treated to a marked increase in the birth rate of flies. I have noted time and again that when complaint is made of the abundance of these pests, and the complaint has been corroborated by the number caught by traps or paper, within a short time there is an increase in infantile diarrheal disease.

The direct hygienic treatment involves the removal of the infant from the city as soon as practical. If a choice is made it should favor the seashore. It is not sufficient to send an infant away, but it should be kept away for a considerable time, as the dangers of relapse are great.

The infant must be restrained, and if old enough to walk or creep must be placed where these are impossible of accomplishment, for even if strong enough to do so, enforced rest conserves the strength of the infant. While thus controlled, the infant should be kept in the open air as many hours of the day and night as possible.

The clothing should be loose and light, but sufficient to protect the child from sudden changes.

Water externally is important to allay the restlessness, reduce the fever, and place the skin in a healthful condition. For the reduction of temperature, the tub bath may be given at 100° F., and a gradual reduction made by the addition of iced water until the temperature of the bath is 85° F.

As soon as a napkin is soiled it must be removed, and the removal must be two-fold—from the infant and from the room. Disinfection of the napkins and of the person of the one handling them is necessary.

Excoriations are to be prevented by the free use of boric acid in powder or a zinc ointment.

The direct dietetic treatment involves the withholding of all food during the first twenty-four hours of the attack. No matter how the infant may be nourished, the giving of food at this time is harmful because digestion is practically arrested. The cravings of hunger and thirst may be allayed by the frequent administration of small amounts of sterilized water, thin barley water, or cold whey made without beating the curd. If whey is made without beating the curd the percentage of fat which it contains is much below 1 per cent., but according to the muscular effort of the maker and the quality of the milk, vigorous breaking of the curd will liberate as high as 3 per cent. of the fat. Albumen water should not be given, as its ready decomposition may cause trouble and adds odor to the stools.

If the foregoing are vomited, absolute withholding of everything is essential.

If conditions are improved, the infant may be allowed the breast after the first forty-eight hours, but with the restriction that nursing must be alternate and not over three minutes. An increase is only made as the conditions continue to improve.

If artificially fed, the withholding of milk must be for a much longer period, and in addition to what has been mentioned as useful during the acute stage, there may be used the farinaceous or malted foods without milk, bouillons, and the dextrinized cereals. Panopepton, peptonoids, or bovinine may be used if a stimulant is desired also.

No matter how rapidly the acute symptoms subside, the return to the usual food must be very gradual and slow. These cases are frequently subjects of relapse, and a relapse is often terminated by death within twenty-four hours. I have no hesitancy in stating that more deaths are attributable to a too hasty return to what was the usual diet than to any other one element in the treatment.

It has probably occurred to you, as this paper was read, that I am a firm believer in the fact that infantile diarrheal mortality is a social as well as a medical problem, and much of it is concerned with municipal and maternal care.

Carelessness and ignorance may mean little, as far as adult life is concerned, but in infantile life they are potent factors in the morbidity and mortality. It cannot be too forcibly stated that in breast milk the infant finds a nutriment which is suited to its needs and to the normal functioning of its digestive organs. And this fluid food cannot be perfectly substituted by any other.

Infant diarrhea is much less frequent among the breast-fed than the artificially fed.

But breast-feeding is only a partial security; to serve its fullest purpose, it must be given correctly. The mother who is nursing her own babe must be instructed as to how the food should be given, for with unintelligent management, the breast-fed infant may suffer as well as its less fortunate brother.

There are three chief ways in which instruction may be given:

1. The direct instruction of mothers in the care and management of infants.

2. The "follow-up" system of female visitors to aid in such instruction.

3. The education of girls in domestic hygiene.

Present commercial and economic conditions compel the employment of married women, and while this is unfortunate, it is a fact. There should be more perfect control of these occupations. This control should be such that a limit is placed upon the time before and after confinement when a woman is allowed to work. And when the time limit is removed, the infant's care during the absence of the mother should be safeguarded. This means that more attention should be paid by the proper authorities to the regulation of day nurseries.

As practically every case follows some indiscretion in the diet, there must be the most scrupulous care taken that the infant is not overfed, that the feedings are not too frequent, that the formula is one suited to the infant's needs, and that the food is uncontaminated.

Further than this, when the temperature is high, the food of the breast-fed as well as the artificially fed baby must be reduced. In the breast-fed this is done by giving an ounce or two of sterile water immediately before the nursing; and in the bottle-fed by adding water to the food.

Every diarrhea occurring in an infant during the months of June, July, and August must be treated, as far as hygiene and the diet are concerned, as the possible beginning of a fatal disease. Anything short of this is neglect and may prove disastrous to the infant.

It has been accepted in a general way that the infantile diarrheal morbidity is greater among the poorer than the better classes and among the congested portions of a city rather than the less populous.

This indicates rather forcibly that the middle and better classes are consciously or unconsciously using the means to prevent such morbidity. It also indicates another thing: that more attention must be paid to the education of the less favored classes. In this borough (Brooklyn) there should be two things: there should be an addition to the already existing agencies which are undertaking the instruction of mothers and the supplying of a suitable milk, or the great augmenting of that work by the adequate financing of the present agencies. Just so long as the men of charity and means continue to contribute to agencies in Manhattan to the exclusion of the other boroughs, just so long will infantile diarrheal mortality continue to preserve its present ratio.

42 Gates Avenue.

MEDICINAL AND MECHANICAL TREATMENT OF "SUMMER DIARRHEA".

BY

ARCHIBALD D. SMITH, B. A., M. D.,
Visiting Physician, Bushwick and East Brooklyn Dispensary, Diseases of Children; Assistant to the Visiting Pediatrist to the Swedish Hospital,
Brooklyn, N. Y.

THE medicinal and mechanical treatment of "summer diarrhea" has been dwelt upon so often that it may seem superfluous to many and of little interest and less importance to others, because they know so well just how to manage such cases satisfactorily. There are some, however, who are not so sure that their treatment in these cases brings the results they desire and who are looking for something better which will help to lower the enormous death rate among this class of little patients.

I regret that I cannot offer you any new or original method of treatment, but this is no reason for neglecting a subject of such importance. The Kings County Medical Society should cooperate with the Department of Health in this borough in its endeavor to lower the mortality from "summer diarrhea," and to this end might well devote one meeting a year to its free discussion.

Probably in no other affection have the little ones suffered more from drug-giving than in "summer diarrhea." The indiscriminate use of powerful drugs is not only uncalled for, but positively harmful. We have all seen cases of catarrhal diarrhea following acute attacks produced by the drugs which have been used. The principle of never giving a dose of medicine without a clear and definite indication is as important here as in the other affections of infancy and childhood.

It is easy to overdo the treatment; hours of rest will do more than hours of treatment.

THE GENERAL PRINCIPLES OF TREATMENT.

The general principles are the same for all cases, and so distinct that there is no mistaking them. In applying them we are to remember that we are dealing with an intoxication arising from the intestinal contents, and that an inflammation of the stomach or intestines may or may not be present. They are—

I. *Rest in Bed and Rest to the Stomach and Intestines.*
II. *The Thorough Emptying of the Stomach and Intestines.*
III. *Fluid Must be Supplied to Compensate for the Great Drain.*
IV. *Elimination of the Toxins.*
V. *Measures to Allay the Inflammation.*

To these general principles must be added—

VI. *The Treatment of Special Symptoms.*

I. *Rest in Bed and Rest to the Stomach and Intestines.*—It is universally recognized that rest to the stomach and intestines is a *sine qua non* of the treatment. I wish also to emphasize the importance of keeping these patients quiet in bed. Even if the child is able to walk, it should not be allowed to do so.

Rest to the stomach and intestines is accomplished by withdrawing all food for from eight to twenty-four hours, and sometimes longer. The withdrawal of food should be complete. No compromise will avail In all severe cases digestion is practically at a standstill, and food given at this time will only increase the difficulty of the position. Boiled water is to be given cool at frequent intervals and in small amounts at first. The previous paper has admirably described the details of the withdrawal of food, and I merely mention it to emphasize it. After the return to food the nourishment must be maintained without adding to the irritation.

II. *The Thorough Emptying of the Stomach and Intestines.*—The initial vomiting sometimes empties the stomach completely. If any doubt exists the stomach should be washed out. In the severe cases vomiting is apt to recur persistently. A single washing with the fluid at 110° usually controls it. In the severe cases of the cholera-infantum type the stomach is always to be washed out. When the fever is high, one or two ounces of water may be left in the stomach. To this lime-water is added with benefit if the stomach contents are very sour.

Stomach-washing is easy and the apparatus simple. It consists of a soft-rubber catheter, size 12, American scale. An extra opening should be cut in the side near the end. To the catheter is joined two inches of glass tubing. To the glass tubing is joined two or three feet of rubber tubing and a funnel. The catheter should be moistened with the fluid used, the tongue depressed by the forefinger of the left hand, and the catheter rapidly passed into the pharynx and down into the esophagus. As a rule, about nine or ten inches of the catheter should be passed beyond the lips. When it has reached the stomach the funnel should be raised as high as possible to allow the escape of gases almost always present. It is then lowered to siphon out the fluid contents. If nothing escapes the funnel is again raised and water poured into it from a pitcher. The funnel is then lowered, and the water siphoned out. This procedure is repeated until the washings are clear. About a quart of water can be used to advantage. The temperature of the water is ordinarily 100°. When the stomach is very irritable it should be 110°.

In children over two years of age stomach-washing cannot be employed without undue struggling, the very thing we wish to avoid. As a substitute for stomach-washing boiled, warm water may be given freely. It is usually vomited promptly and may cleanse the stomach, but is not to be depended on as stomach-washing is.

For emptying the small intestine cathartics alone are available.

Calomel will usually suffice in the mild cases. It is a mild intestinal antiseptic and increases the flow of bile. It should be given in 1/8 to 1/4 grain doses every hour until the characteristic green stools are seen.

Castor oil should follow the calomel in all severe cases in four to six hours. Two drams should be given to a child a year old. It will frequently be vomited, but is so adhesive that it cannot all be vomited, and if repeated often enough its effects will soon be manifest. It sweeps the whole intestinal canal, is very certain, and its after-effects are soothing.

Saline cathartics are used if the movements are small in amount, and we wish to aid in elimination. They should not be used, however, when the patient is greatly depressed, with sunken fontanel, low temperature, and evidences of great need of water. Milk of magnesia is prompt and antacid, but it is mild and not to be relied on in serious conditions. The sodium sulphate is better borne by the stomach than any of the other salines except the milk of magnesia. It is best given in repeated small doses, 10 grains in 1 dram of water to a child a year old.

Colon irrigation should be used in all severe cases to supplement the action of cathartics. It should be done by the physician himself or by a competent nurse two or three times during the first day. Afterward once daily is usually enough. The best solution is normal saline, one tablespoonful of salt to two quarts of water, at a temperature of 100° ordinarily. A long rectal tube or catheter should always be used.

To properly irrigate the colon requires a fountain syringe.

five or six feet of rubber tubing, and a flexible rubber tube or soft-rubber catheter, No. 16, American scale. The child is placed upon the back with the thighs flexed. He should lie upon a Kelley pad or rubber sheet which drains into a large basin or pail. The bag containing the normal saline is hung about 2 feet above the child at the beginning, so that the initial current will be gentle and not excite too active peristalsis. Later, the bag may be raised to four or five feet. The water is turned on to expel any air there may be in the tube or catheter. If a catheter is used it is inserted just within the sphincter and the water again turned on. As it flows the catheter is gradually pushed upward to a distance of twelve or fourteen inches. The water distending the intestine in advance of the catheter makes its introduction quite easy. If, however, the attempt is made to introduce the catheter before turning on the water, it almost invariably turns upon itself. Unless it is passed quite to the descending colon, only the sigmoid flexure is likely to be reached. Usually a pint and often a quart will be introduced before much returns. At least half a gallon of saline should be used for a single irrigation. The washing should be continued until the solution returns quite clear. Gentle kneading of the abdomen should be continued, during the early part of the irrigation especially, to facilitate the passage of the water into the upper part of the colon. At the end of the irrigation the rubber tube is detached and the water allowed to escape through the catheter. The colon of an infant six months old will hold a pint without distention. At two years the colon will hold from two to three pints.

When the temperature is low with symptoms of collapse the normal saline should be at a temperature of 110°. If the temperature is high, it can be reduced by using the solution at a temperature of 80°.

III. *Fluids must be Supplied to Compensate for the Great Drain.*—In the mild cases this can be accomplished by giving cool boiled water frequently. In the more severe cases the colon will absorb a considerable quantity of fluid if, after the initial thorough cleansing, the irrigation with normal saline is continued, allowing the water to flow in and return slowly, and using as much as one or two gallons. In the most severe cases of the cholera-infantum type, the only efficient method of supplying the great amount of fluid lost is by hypodermoclysis. At least half a pint should be given in the course of twelve hours, and sometimes more is better. The injection into the cellular tissue of the abdomen or buttocks is to be made slowly and the exact amount given each time is measured.

IV. *Elimination of the Toxins.*—Elimination is assisted by the fluids supplied. The colon irrigations assist in the elimination from the bowels, the kidneys, and the skin. Occasionally the saline cathartics are useful to assist elimination from the bowels. Bathing is useful to assist elimination from the skin.

V. *Measures to Allay the Inflammation.*—Rest to the stomach and intestines is important, and has been more fully discussed previously. After the digestive tract has been thoroughly cleaned out, and the toxemia lessened, the inflamed intestinal mucous membrane should be covered with bismuth. To accomplish this bismuth subnitrate must be given in large doses, at least 1 to 2 drams daily to a child a year old. It is insoluble in water, and is best given suspended in mucilage. It usually blackens the stools.

Intestinal antiseptics are useful even if they do not render the whole intestinal tract antiseptic. Certainly it is reasonable to believe that they inhibit bacterial growth, and experience seems to leave no doubt that they are beneficial. Salol is the best as it leaves the stomach unchanged, and is decomposed in the intestines into carbolic and salicylic acids. It has the disadvantage of causing vomiting sometimes. It should be given in doses of 1 or 2 grains every 2 hours to a child of two years. Bismuth is also antiseptic, though this action is secondary to its protective influence on the mucous membrane.

Astringents are indicated only in the catarrhal diarrhea which follows the acute symptoms. Tannalbin is the most useful. It is insoluble in the stomach, but is slowly decomposed in the intestines. It therefore causes no gastric disturbance, but is gently, yet firmly astringent on the entire intestinal mucous membrane. Patients under one year are given 15 to 30 grains in the twenty-four hours. Sometimes it can be used with opium. It is insoluble in water, and should therefore be given in gruel or suspended in mucilage.

Opium is used much too frequently, and often at the wrong time. Its indications are a continuance of the frequent movements and severe pain. It is contraindicated until the stomach and intestines have been thoroughly cleaned out, when the number of discharges is small, and especially if they are offensive, and when cerebral symptoms and high temperature are present with scanty discharges. It finds its best use during convalescence when the taking of food is followed by a movement of the bowels. To a child of one year 5 minims of paregoric may be given in a separate prescription, to be repeated until the desired effect is obtained. In cases of the cholera-infantum type with large fluid movements and symptoms of collapse, morphine should be given hypodermically, 1/100 grain to a child one year of age, remembering always the contraindications.

VI. *The Treatment of Special Symptoms.—Acid fermentation in the stomach*, manifest by the vomiting of sour material and the eructation of gas, is best met by the alkalines, lime-water, bicarbonate of soda, or chalk mixture. Either of the first two may be added to the water used for washing out the stomach when indicated.

Prostration is present in the majority of cases. It is best relieved by whisky, diluted with at least eight parts of water. It can frequently be added to the water given to allay the thirst. Half an ounce of whisky in the twenty-four hours to a child one year old is the maximum amount as a rule. If needed, tincture of strophanthus, 1 or 2 minims every four hours, may be added to the whisky. If stimulants given by the mouth are vomited and if the case is a severe one they are to be given hypodermically. Whisky, ether, and camphor, 5 to 10 minims of a 1 in 10 solution in sweet almond oil may be used. Strychnine is not to be used when the nervous symptoms are those of irritability with a tendency to convulsions. The dose is 1/300 grain to a child one year old. In cases of the cholera-infantum type morphine 1/100 grain with atropine 1/1200 grain hypodermically is sometimes life-saving. In connection with these cases hypodermoclysis finds its most certain indication.

Fever must be controlled in some cases. Only tub baths are to be relied on for this purpose. They are continued on the average for about ten minutes, as often as every hour if the case demands it. The child is placed in water at 100°, and this is gradually cooled with ice to about 80°. Gentle friction over the entire body is kept up during the bath. Cold water rectal injections are a valuable aid in lowering temperature. Iced cloths or an ice-cap may be applied to the head. The feet should be kept warm. The cold pack can ofter be substituted with advantage for the tub bath. The child is stripped and rolled in a sheet wrung out of water at 100°. Ice may now be rubbed over the outside of the sheet, in front and behind. The rubbing with ice may be repeated in a few minutes if necessary. The child is then rolled in a blanket without the removal of the pack. Heat may be needed to the feet. Sponge baths are of some value.

Abdominal distention can be relieved by colon irrigations containing turpentine. Turpentine stupes and mustard compresses to the abdomen are of aid.

Tenesmus can be controlled by enemas of starch with or without opium. The anus and prolapsed rectum may be covered with 5 per cent. cocaine ointment.

For cold extremities and subnormal temperature hot mustard baths and the mustard pack are useful to establish reaction.

Management of Convalescence.—Relapses are common. They are easily excited by wrong diet and by very hot weather. The return to milk must be very gradual, and it should be diluted on hot days. Many cases require it peptonized. Lactic acid milk or buttermilk has no place in the feeding during the acute attack, but finds its best use during convalescence. General tonics are of value, such as iron, arsenic, and nux vomica.

The Antitoxin Treatment.—While it is true that bacteria of many different kinds are directly or indirectly responsible for the symptoms in a large proportion of cases, in only one form is there any hope of success from the antitoxin treatment. This is infection with the true Shiga bacillus, the bacillus dysenteriæ. The true Shiga bacillus and its allied forms are now recognized as playing a part in the bacteriology of the diarrheal diseases of children in this country. The true Shiga bacillus or alkaline type was shown by Shiga to be the cause of epidemic dysentery in Japan in 1898, and the closely related Flexner or acid type was shown by Flexner to be associated with tropical dysentery in the Philippines. The investigations of the Rockefeller Institute during the summer of 1903 showed the bacillus dysenteriæ present in 270 cases out of 412 in children. The Flexner or acid type was found most frequently, although the true Shiga bacillus was occasionally present, and sometimes they were associated. As a result of the great amount of work done with these organisms there is no longer any doubt that the true Shiga bacillus does produce in culture media a definite soluble toxin, and that an antitoxin is produced in the blood of immunized animals which is a valuable specific curative agent. It also seems to be true that the other closely related varieties of the bacillus dysenteriæ, such as the Flexner type, do not produce a soluble toxin, and against these no satisfactory antitoxin has been produced. To be of value, therefore, the antitoxin treatment must be used in those cases of infection with the true Shiga bacillus. Unfortunately, at the present time it is impossible to distinguish the cases of infection with the true Shiga bacillus clinically. It is associated with almost every sort of intestinal disturbance accompanied by diarrhea, except cholera infantum, of which no cases have been studied. Bacteriological examination must be resorted to in order to isolate the bacilli from the stools. They are agglutinated usually by the blood of the patient. Many of the contradictory results from the use of the antitoxin in children can be explained on this basis, namely, that the antitoxin was used in cases infected with the allied organisms rather than the true Shiga bacillus. At the present time, therefore, while we are restricted to the statement that the antitoxin is used with much benefit in the cases of infection with the true Shiga bacillus, the future may reveal an antitoxin useful against the toxins of the bacilli closely allied to the true Shiga bacillus.

97 HALSEY STREET.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Meeting of March 18, 1909.

The President, JOHN A. WYETH, M. D., *in the Chair.*

This meeting was held under the auspices of the *Section on Orthopedic Surgery* and was devoted to

WHAT SHALL WE DO WITH OUR CRIPPLES?

Widener Memorial Industrial School for Crippled Children, Philadelphia.—DR. DEFOREST WILLARD, surgeon-in-chief of this institution, stated that Rosenfeld had estimated that one-sixth of the inhabitants of Germany were more or less crippled and that if this great company could be made self-sustaining the annual gain to the German Empire would be $30,000,000. It would be a great advantage if the Academy of Medicine could induce the Commissioner of Census in 1910 to secure statistics as to the number of cripples in this country. Such statistics would doubtless contain not more than one-half the actual number, as many are unwilling to class themselves as cripples.

One hundred years ago practically nothing was done for this class of unfortunates. Weakened as these children are in body and handicapped in securing any occupation that promised a livelihood, they were prone to become discouraged and often, though well equipped mentally, degenerate. The aspect of a child was frequently changed from that of dispair to hopefulness when, after a simple operation, the surgeon has placed the child upon his feet and shown him that he could assume his place among other child en. To simply place these children in an institution, to give them board and lodging, offered no inducement for the future in the stimulation of their pride. Many of these children were possessed of active brain and could be trained in spite of their physical defects to earn a fair living. Many cases formerly regarded as hopeless were now capable of being greatly improved by surgical methods, mechanical appliances, or by common-sense hygienic treatment. It was only eighty years since surgery was invoked by the tenotomies of Stromeyer to assist in the rectification of these deformities. There had been a steady advance from that time until the present, when with tenotomies, myotomies, forcible corrections, osteotomies, transplantations of tendons and nerves, excisions, arthrodeses, etc., results could be achieved in a few weeks' time which formerly would have been regarded as miracles. Forty years ago he had determined to secure if possible: 1. A hospital where these cripples could be either cured or greatly benefited by surgical, mechanical, and hygienic measures. 2. To secure a fund for supplying these patients with the braces and apparatus which were essential to their locomotion. 3. To educate and train each cripple along lines best suited to his physical deformities, mental condition, and powers for self-support. 4. To endeavor to educate medical students in the diagnosis and treatment of these cases and to open the eyes of surgeons to the fact that while they were helpless they were not hopeless; that is was a sin to pass carelessly over these handicapped individuals simply because time, care, and patience were required for their relief. The hospital and funds had been secured and he had endeavored to do his part in teaching what could be done in curing and assisting these cases. Some ten years ago he had presented the needs of this class to Mr. P. A. B. Widener, a millionaire philanthropist of Philadelphia, and as a result they had to-day this school for the mental and manual training of cripples. This school was but three years old, and only cases under ten years of age were admitted, so that as yet all the inmates were too young to have put into effect the methods which they hoped to develop within the next ten years. As the work was largely along new lines, they advanced slowly and hoped that each year would add new ideas and new experience. Mr. Widener had purchased thirty acres of land in the outskirts of the city which presented a most attractive and elegant appearance as regards grounds and buildings. He had expended $1,000,000 and endowed the institution with $3,000,000. The object of the institution was to supplement the work of the hospitals, to strengthen and renew the weak ones and to educate them in habits of industry, order, cleanliness, self-respect, and self-reliance, and to apply such mental, moral, and religious training as would render them true, honorable, and useful citizens. The children were admitted between the ages of four and ten and remained until twenty-one, parents being required to sign an indenture binding the child over to the trustees until it should reach its majority. Feeble-minded children were not eligible. The child in order to be admitted had to be a cripple, but improvable. There was a central hospital building, with wards, solarium, operating, surgical, and dressing rooms, photograph, *x*-ray, gymnasium, etc. There were cottages for boys and girls to hold twenty each. Each cottage was presided over by a house mother who was expected to provide all the surroundings of a well-regulated home. There was also an educational building, an industrial building, an administration building, and an isolation building. On admission children were detained for two or three weeks in the isolation ward in order to prevent their carrying infection into the school. Thence they were transferred to the hospital department, where they were given such treatment as their condition required, regardless of the time that this might take. In this department all the means known to science were employed. The best hygienic conditions prevailed. Much time was spent in the open air; an outdoor gymnasium and broad playgrounds tempted to outdoor exercise. Glass-covered pavilions furnished winter playground, which were always dry and free from snow. Children incapable of locomotion were transported in wheel-chairs and go-carts; none were confined to the house except in cases of acute illness. The children were constantly under the supervision of the resident physician and a trained nurse. As soon as the condition of the children permitted they were advanced to the cottages and were under the direct care of the house mother, where as far as possible the conditions of a normal home life were maintained. When the child reached the proper age it was sent to the school room where the grades corresponded to those in the public schools, and every pupil could secure a good common school education. A few who showed unusual aptitude would be given a higher education. Pupils who showed unusual ability in voice or instrumental music would receive such training as would enable them to earn a livelihood thereby. Manual training was begun when the pupil reached a certain advancement in the school grades and the time allowed to it was increased each year until an occupation or trade would be selected and mastered. The choice of a trade would be determined by the desire and inclination of the pupil and by the physical and mental ability which he manifested. It was the object to select for each pupil that trade which would develop and employ his greatest earning capacity. Since the oldest pupils were at present but fourteen years of age, the advanced grades had not been organized. Trades might be selected from the following: farming, floriculture, care of poultry and stock, dairying, carpentry and woodwork, use and care of machines and engines, operation of elevators, leather work, making of shoes, braces, crutches, tailoring, dressmaking, millinery, printing, cooking, housekeeping, laundering. Wages would be paid to advanced students, who would then be charged for board, and a saving fund had been established to cultivate habits of thrift. Discipline was obtained by methods commonly employed in well-regulated homes, and it was found that there was no more occasion for punishment than in the ordinary family. The pupils were not permitted to go home, but visitors were allowed every Sunday and the first Saturday of each month from 2 to 4 P. M. The first patients were admitted to the school in March, 1906, and at present there were ninety-one children ranging from four to fourteen years of age. There were at present accommodations for not more than 120. Already such progress had been observed in the physical, mental, and moral development of the children that the founder and those in charge are encouraged to continue and advance the work, believing that the ultimate results will fully justify the great effort and cost of the work.

The Opportunities for the Employment of Cripples.—F. W. PERSONS, of the Charity Organization Society of the City of New York, said that it had long been accepted that the best way to help others was to help them to help themselves, and modern education and efficient modern charity had made consistent efforts to put this precept into practice. It was, accordingly, noteworthy that the persons who were most obviously handicapped and who for ages had been regarded as the accepted types most worthy of the assistance of benevolent individuals should be the latest to receive help of this character. There was no provision for the industrial training of crippled adults, and special training for crippled children had not been provided until recently and was now woefully inadequate both in kind and amount. There had been little wisely directed effort to provide suitable employment and thus save to self-support and to self-respect those who were obviously unfitted to engage, on equal terms, in the struggle for existence. The result had been great waste of character and of charitable funds. The beggar with misshapen body or useless or amputated limbs made a powerful appeal for sympathy. For too long a time this charitable interest in the cripple had been expressed in impulsive, indiscriminate, and harmful almsgiving. Public begging had for ages been condoned as a recognized means of livelihood for cripples. The person who had suddenly been disabled by industrial accident was less likely to become dependent than was the cripple who had been so afflicted from childhood and never self-supporting. It was not easy to find employment for a cripple who was without a training related to his disability. Special and continuous study was required to discover a sufficient variety of opportunities for the employment of persons suffering every variety of partial disability and representing every degre of diminished capacity. During one period of fifteen months there were 1863 arrests of confirmed mendicants. Of these 701 were physically defective, and 447, or 24 per cent. of the entire number, were crippled. These figures were noteworthy as illustrating the result of the lack of industrial opportunity which must be encountered by each crippled person who was equipped with nothing but limited physical strength and diminished bodily capacity. The mendicant cripples constituted a small proportion of the cripples who were self-supporting, and a yet smaller proportion of the entire number of crippies in the community. Charity was the individual and personal consideration which each person so disabled must receive in order to determine precisely his capacity for work. A special effort and plan was necessary in each case. The nicest judgment must be exercised in adapting the employee to the work of the employer. The first effort to give this necessary attention to the opportunities for employment for cripples was the establishment of the Special Employment Bureau for the Handicapped by the Charity Organization Society. This bureau registered cripples and persons handicapped in other ways, and attempted to find for them employment suited to their physical and mental condition, in which they might be wholly or partially self-supporting An able-bodied person could not register in this bureau. There was no training school connected with it and no relief was administered through the bureau.

During the twelve months to which these statistics related, the Bureau registered the applications of 1,217 handicapped persons, and placed 477 in steady work at wages averaging $6.98 a week. Temporary work was found for 234 others, making a total of 711 handicapped person who were helped during the year of great industrial depression. But services of this kind could never afford a solution of the problem of employment for cripples. It tended to lighten the load of relief work which the community must carry. Its work was preventive in that it was the means of placing persons who were in impaired health in employment favorable to the arrest or cure of their disease. It thus tended to arrest the progress of those on the way to chronic invalidism and permanent disability The work was educational in that it was the means of bringing to the attention of the employer persons able to do faithful and valuable work, and in that it awakened a feeling of responsibility on the part of such employers toward their weaker brothers. The experience gained in the bureau thus far had made very evident the necessity for three lines of special effort and study in connection with the subject of employment for cripples. First, a study of the dangerous trades and the consequence of such employment on the health and capacity of those so employed. This should result in measures effectual to prevent the manufacture of cripples at the present appalling rate. Second, a study of all kinds of employment, and especially of factory work, to discover the particular places available for the employment of persons suffering disability of every kind and degree. Third, there was imperative need for adequate and suitable specialized education and industrial training for crippled children starting life under the heavy handicap of ill health and physical disability. The Special Employment Bureau had undertaken the second line of investigation in New York. For a year an expert investigator studied factory work. A number of factories were selected representing 140 different trades, and were visited for the purpose of ascertaining what opportunities they afforded for employment, and of informing the prospective employer of the exact nature of the work the bureau and of the kind of employees that could be provided. Each of these factories was carefully inspected with regard to the following conditions: whether training was necessary before the work could be undertaken; whether there were trade union restrictions which must be met before employment could be obtained, and, if so, whether the trade unions concerned would accept as members handicapped men or women; the whole question of wages; the amount of work and the length of hours, in rush as well as in slack season; the nature of the work and the amount of skill and physical strength required; the conditions of employment affecting health, as determined both by the nature of the work and by the conditions in the factory; the possibilities for advancement; and the classes of handicapped persons most adaptable to the particular kinds of piece work under consideration. The radical treatment of the problem of self-support for cripples lay in universal opportunities for suitable education. The present opportunity in this city was admittedly insufficient. The best available census showed that there was 2,700 cripples of school age, and this was known to be incomplete. In all the schools and classes for such children were registered only 932 pupils, and this indicated that there were at least in New York 1,500 children who were unable because of physical disabilities to attend regular classes in the public schools, and were without proper educational advantages. The training and education of the crippled child was primarily a professional rather than a philanthropic problem. Its solution would require the devoted attention and cooperation of teachers, physicians, and surgeons. There would be no lack of public support for the training of cripples that showed satisfactory results. The greatest present danger in this work was the inability to make efficient use of the means so rapidly becoming available. In closing he said this was the professional problem. There would always be a place for philanthropy in aiding cripples to find the means of self-support, but the greatest need to-day was the education which would help them to help themselves.

DISCUSSION.

Mr. Sherman, formerly State Commissioner of Labor, said that practically all who had studied the subject under discussion were entirely in accord with the conclusions drawn and opinions expressed. He did not know whether he could confirm the figures as to the number of people injured in accidents; it would be a sympathetic guess. But the number of accidents reported in factories for the year 1907 was 19,000. Of the persons injured, between 4,000 and 5,000 were either permanently injured or reported to be so seriously injured as to be practically permanently crippled. About 90 per cent. of all the accidents occurring in factories were in men. This meant that in the State of New York, in the factories alone, there were approximately 3,600 to 4,000 people, who were efficient and industrious, suddenly thrown out of work and who were to be found in the ranks of the cripples. The law made no provision for their care or support, and they were turned over to public charity.

Mr. Sherman said he wished to say a few words to explain the situation under the law in this State as contrasted with other laws. The law in this State was the old common law of England. It provided that the employer should provide a proper place for the employee to work in. The employee assumed all ordinary risks of the business, and the employer was only liable when accidents occurred through negligence on his part. But the unreasonableness of this was shown that when an accident occurred in a factory, did it really occur through the negligence of either party? Factory accidents may result from machinery, dynamos, smoke, gas, etc., and it would be very hard to prove negligence on the part of either employer or employee. Again it was seldom that where a gang was employed and an accident occurred the person negligent was the person injured it was another person in the group who was injured. That meant that the person injured could not sue his employer because the employer was not negligent. The question arose, What was meant by negligence? It was the juries who determined this and assessed damages, influenced largely by their sympathies and not by the real facts.

Mr. Sherman said it came to this, that when an employee was injured he started in to sue his employer, and litigation would go on for years, and it was simply a gamble whether the injured got anything. Our courts were filled with such cases, and about 60 per cent. of the time of these courts was occupied with these cases, and the tax payers had to pay out millions of dollars to pay the legal machinery. Then if the case was won, the expense of litigation paid, the attorneys paid, the employee will probably get 20 per cent. of the amount of damages. That was an unjust system. Abroad they had gone over this as they had in this country, and now practically all the industries of Europe have abandoned all laws. The fundamental principle in all Europe is that the industry must pay the costs of the injured, and not have the cost thrown onto the workman and general public in charity. It was time to take up this subject and inquire into it intelligently. He thought that they might have an adaptation of the law as it existed in Europe; then all classes of cripples would be well provided for and by money that was not wasted in litigation.

DR. VIRGIL P. GIBNEY said that there had grown up in this city hospitals and institutions for crippled children and they were well provided for; they had extended to them the hand of encouragement and fellowship and good feeling, and they were helping them to be useful without being dependent upon the city. Many years ago at the Hospital for the Ruptured and Crippled he was in the habit of seeing adults and adolescents on street corners begging after having been inmates of the hospital. They seemed to tire of the hospital life and made better living begging on the street corners.

So far as their care in the hospitals was concerned, he believed the best way to prepare the crippled for usefulness in life was for them to exert their energies toward securing for them proper and useful limbs; that was what the Hospital for Ruptured and Crippled stood for. There was no iron-clad rule about sending patients out; they were kept long enough to give them the best possible use of their limbs. They always had had schools in the hospital, and they endeavored to combine education of their minds with other treatment. In fact, he said it might surprise them to know that they had to get up very early in the mornings to get through with the hospital work so that the educational work could start at 9 o'clock. They had a good public school system, as well as singing classes. They made the children as cheerful as possible. They a'so maintained an industrial branch. They endeavored to bring out every possible phase of the child's character to give him usefulness in his after-life. Many of the patients who had been in the institution in the seventies or eighties were now useful members of society, and in business, doing good work in the city.

DR. THEODORE C. JANEWAY said that in this, as in all philanthropic work of to-day, the thing to be accomplished was prevention, and the curative measures should be a secondary consideration. The preventive work and certain important subdivisions; cripples arose in two different ways: as the result of accident and as the result of disease; and the preventive measures applicable to the one were not applicable to the other. In the case of one, prompt and efficient surgical treatment would do away with a large amount of the disability. This could not always be applied in the case of the other. Much, however, could be done in the treatment of tuberculous bone and joint disease by prompt action. There would remain many permanently crippled from accident and disease, no matter what preventive measures were adopted. There were the borderline cases, those who were only partially crippled, and who had a certain degree of ability to work, and they were the ones that needed looking after in order that they should not become public or private charges. Industrial training, to be useful, required a primary basis of scientific research into the industrial possibilities of cripples of particular types; the extension of such research was the real field of charity in connection with this work. It should be pointed out to those persons who were responsible for the education of such children that, if the training was to be of value to the individual or to he community, they must take up certain lines n which opportunities were numerous in order to assure them of self-support when they left the institution.

Miss Perry, of Boston, told of the school for cripples which was started fifteen years ago, and which had progressed slowly; however, during the past five years they had made more progress than in the ten years preceding. At present there were seventy-five children in the wards, and the mental work corresponded to the work in the public schools. There were thirty pupils in the industrial workshops. At the same time they were giving instruction in the wards, the children were receiving manual training. Some worked two hours a day in the printing office, some worked at basket braiding, in sewing, in caning chairs, making boxes, etc.

Dr. Thorndike, of Boston, said that the problem of how the cripple could support himself was still unsolved. In the institution he was interested in they were taught cobbling, boating, and various other trades, and it remained to be seen whether they were to be successful in their efforts. Just outside of Boston there was another school, State Hospital for Cripples, which had been in existence for one year; it was under State government. The number of children was now 100. Many of them were tuberculous. Before going to bed, their clothing was warmed; then the shacks were thrown wide open. They had wide-open school rooms, kept open all during the day, and the gain in health from this change was phenomenal. They endeavored to teach them outdoor employments, such as farming, gardening, etc.

Dr. Wallace said that few realized how many crippled children there were in New York City, and he quoted from the annual report of the Hospital for Ruptured and Crippled in which it was stated that 6,082 children, new patients, were treated in the outdoor department in one year. He thought there might be in New York City at least 7,000 crippled children. Last year they discharged 571 children, and what became of them he did not know. There were 564 crippled children in ten various schools in this city. Among the things to be considered in the care of these crippled children were transportation, food, manual training, and their mental training.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Amyluria.—I. S. Wile (*N. Y. Med. Jour.*, Feb. 20, 1909) says that the presence of starch granules in urine has been noted by innumerable observers. The general conception of such findings has been that the starch granules are accidental and result from contamination by starch from dusting powder, underwear, etc. In thirty-five children under observation by the writer amyluria was found fifty times. The precautions taken to exclude contamination and insure favorable conditions for fair observations were: urine from males only was used; lycopodium was used as a dusting powder; penis washed with a flow of water before securing specimen; penis inserted into a clean bottle and held in place through the use of adhesive straps; bottles covered immediately after the urine was secured; the writer was kept in ignorance of the foods used until after his observations were completed; all centrifuge tubes, test-tubes, glass slides, etc., were tested for starch before utilizing them for the work. A résumé of these observations shows that starch granules are absent from the urine of breast-fed infants; but are frequently present in that of infants on carbohydrate food. The degree of amyluria varies with the nature and preparation of the food, the quantity ingested, and the condition of the individual. Starch in urine at times gives a reaction simulating that of albumin. Starch passing through the kidney may cause albuminuria with casts. Amyluria does exist, and starch in the urine is not necessarily of extraneous origin.

Tubercle Bacilli in Milk.—A. F. Hess (*Jour. Amer. Med. Assn.*, Mar. 27, 1909) has found virulent tubercle bacilli in seventeen among 107 specimens; that is, in 16 per cent. of the milk retailed from cans in New York City. These were proved to be present by animal inoculation. Cream as well as sediment was found to harbor these organisms, so that in all experiments of this nature these two parts of the milk should be used in making inoculations. Tubercle bacilli were likewise found in a specimen of "commercially pasteurized" milk, showing that this method, as now carried out, does not insure protection in this particular. The tubercle bacilli isolated were in all but one instance bovine in type. In this instance a human variety was differentiated, which shows that milk may become infected from tuberculous individuals, and that this source of contamination should be guarded against. A number of infants and young children who drank milk containing tubercle bacilli, when examined one year later, seemed to be in average health. A fourth of the number, however, reacted to tuberculin. One of these subjects was in poor physical condition and had suffered from a recent glandular infection. Although probably over 90 per cent. of tuberculosis is due to infection from human beings, it is believed that we are not, therefore, justified in neglecting the danger from bovine infection. As an immediate safeguard, milk not coming from tuberculin-tested cows should be pasteurized or brought to a boil.

Artificial Feeding of Infants.—Julius Levy (*Arch. Ped.*, Mar., 1909) reminds us that there is a minimum proteid requirement below which we should not feed infants as well as a maximum caloric requirement which we should not exceed. Only enough fat is given to make up the necessary calories after the amount of proteids and carbohydrates are determined. The percentage will rarely be above 3 per cent. Most disturbances of nutrition in the second half-year are due to overfeeding and will be avoided by the caloric estimation. In determining how to modify cow's milk, we must be guided, in the first place, by the proteid and caloric requirements of the infants' metabolism. These vary with the weight and development of the injant. The percentages of proteids and fat will vary with the quantity of food fed and merely are representations of the number of grams of each ingredient in the total mixture. To find out the minimum percentage of proteids we may feed an infant we need to know the weight of the infant and the total quantity of food to be fed in twenty-four hours. The percentage of proteids will be found by dividing the total number of grams of proteids by the total quantity of food. To find the percentage of fat we first determine the total caloric requirements of the particular infant and subtract from this the number of calories supplied by the proteid and carbohydrate. This gives the number of calories to be supplied by the fat. The calories so to be supplied divided by 9.3 gives the number of grams of fat that will be in the mixture, and this divided by the total quantity in grams will give the percentage. In this method it is found that top milks are rarely indicated.

Typhoid Fever in Children.—Marfan (*Jour. de Med. et de Chir.*, Feb. 27, 1909) describes typhoid fever as it occurs in children. It is more infrequent in children than in adults, and is rarely seen before the fifth year. The youngest patient attacked by typhoid seen by the author was nine months old. The general methods of infection in infants are by milk diluted with impure water, the use of unsterilized milk, and the washing of milk containers in bad water. A wet-nurse may give the fever to her nursling. At birth a child may bring with it into the world the germ which has attacked the mother during pregnancy. The onset of the disease is more sudden than in the adult and it reaches its acme sooner. From the second day the temperature is very high. Diarrhea is absent, and constipation the rule. There is an exaggerated hypothermia and very few digestive troubles, anorexia and the typical tongue being absent. The stools are infrequent and of an ochre color. Meteorism and abdominal pain are generally absent. Hemorrhages and perforation of ulcers are very exceptional. The Peyer's patches are not much swollen or deeply ulcerated. There is rather a septicemia than a true typhoid condition. Rose-spots are not always present, one-third of the cases never showing them. Sometimes they appear earlier and are more abundant than in the adult. Relapses are more frequent than in the adult, and the rose-spots return with the fever. There is generally a desquamation which is distinguishable from that of scarlet fever only by the absence of the large plaques of skin that appear in the latter disease. There are two distinct forms of typhoid fever: a very slight one, of short duration, and a severe form, more curable than in adults. The causes of the less severity are perhaps the good digestion the development of the lymphatic system, and the general good condition of heart, kidneys, and liver. Frequent complications are meningitis, paralysis, and otitis.

Spontaneous Infantile Myxedema.—Auguste Beudry (*Jour. de Med. et de Chir.*, Feb. 27, 1909) gives the cause of the myxedematous symptoms as the atrophy or absence of the thyroid gland in infants either congenital or acquired. When beginning at a period after birth its cause may be a congenital smallness and consequent insufficiency of the gland. When there are too great demands for the typhoid secretion, which will occur sooner or later, the symptoms of myxedema come on. Either the thyroid elaborates a substance useful to the organism, the absence of which causes the symptoms, or the office of the gland is to remove from the circulation substances that are deleterious, which are not removed when atrophy has occurred. At whatever period of the child's life this insufficiency occurs, the development of mind and the growth of the skeleton immediately cease. The patient becomes an idiotic dwarf—an entire idiot when the suppression of function is early, an imbecile when it occurs later. As the thyroid plays so important a rôle in the genital system of the female, there are more myxedematous females than males. The dwarf is afflicted with a solid edema of the skin and mucous membranes, which gives him an expressionless, swollen face, a thick tongue, and hoarse voice. The patient shows a great disinclination for all kinds of movements, is cold on account of the lowered temperature, has a feeble and compressible pulse, and an open fontanelle. Puberty never becomes established. The only successful remedy is the use of thyroid extract.

Cardiac Complications of Articular Rheumatism in Children.—Marfan (*Jour. de Méd. de Paris*, March 1, 1909) says that cardiac complications are more frequent in children than in adults. The rheumatic symptoms may not be very intense and the joints show little or no swelling, but the effect on the heart may be very marked. Fever is not generally high. In babies there is a prominence of the cardiac region due to the softness of the thoracic walls and marked undulations of the precordial region are noticeable. In the infant with a simple endocarditis there is no true hypertrophy of the heart. Compensation is effected more easily than in the adult, and mitral insufficiency is well tolerated. Pericardial adhesions are frequent and cause asystole. Asystole in infants is characterized by hepatic stasis. There is a notable lessening of the vesicular murmur at the right base, and the area of liver dullness is increased.

Congenital Syphilitic Infection in Children.—P. B. Bennie (*Inter. Med. Jour.*, Mar. 20, 1909) believes that syphilis is never cured. Its intensity is decreased by treatment, but never vanishes. If either parent has ever had syphilis, no matter how well treated, there is a syphilitic taint in the child subsequently born. He thinks that fully 10 per cent. of the children in Melbourne are infected with syphilis. This small percentage affords material for more than half the pediatric work of the general practitioner and includes nearly half of his fatal cases. Speaking generally, the chances of dying before puberty are, for the syphilitic, seven times greater than for the nonsyphilitic. Infected children should, if possible, be treated in all their illnesses for the syphilitic factor—the favorer of pathogenic microbic associations. If this were done, there would be fewer severe cases and fewer deaths. Before operating on congenital syphilitics, the surgeon should, if possible, subject each one of them to a course of antisyphilitic treatment, for otherwise, on account of their lowered resistance, they take anesthetics badly, do not stand operations well, and are liable to postoperative development of infectious organisms. That operations would then be fewer, often more successful, and less often fatal.

Hemiplegia from Cerebral Arteritis in Heredosyphilitics.—Paul Savy (*Rev. de Médicine*, March 10, 1909) finds among the manifestations of syphilis inherited by infants hemiplegia from cerebral hemorrhage due to syphilitic arteritis. This is generally associated with nervous troubles of other nature, and is more or less masked by them. It occurs especially in early infancy, even as early as the fifth month, occurring suddenly, and disappearing under specific treatment in a few weeks or months. A certain amount of impotence and atrophy may persist or a spasmodic infantile hemiplegia may develop. These conditions are absolutely comparable to the syphilitic hemiplegias of adults, which are often transitory and are caused by cerebral arteritis with ischemia and softening of the area supplied by the obliterated artery. We may look for syphilis as a cause of sudden hemiplegia in a child even in the absence of other syphilitic symptoms. Spasmodic infantile hemiplegia frequently has syphilis as its cause. The author gives twenty-seven cases collected by him from medical literature. These cases occurred at from five months to the end of the second year. The early manifestations of syphilis occur within three months of birth, and the dystrophies at from five to twenty years of age, while the arterial hemiplegias occur between the two periods.

The Role of Human Contagion in Infantile Tuberculosis.—J. Comby (*Arch. de Méd. des Enf.*, March, 1909) considers the rôle of milk and meat, of food products and intestinal tuberculosis, a small one in the causation of tuberculosis in infants. Children are born neither with tuberculosis nor with a predisposition to the disease. If the children of tuberculous parents are removed immediately from the surroundings in which the parents cough and spit, and are brought up in good hygienic surroundings, they grow up strong and well. If they remain in their homes they die of tuberculosis, derived from the infected house. Pallor, emaciation, narrow chest, and micropolyadenopathy are symptoms not of a tuberculous predisposition, but of latent tuberculosis. Transmission of tuberculosis by heredity does not exist, neither does predisposition. Those who assert that they do are guilty of misinterpreting simple facts. In the immense majority of cases tuberculosis is derived from the family by inhalation. The measures taken against animal tuberculosis and tuberculous milk have been useless, and have not diminished the number of cases among infants. Neither has sterilization of milk. To have a bad effect milk must be full of bacilli from mastitis. If milk was the cause, all the people who drink the same milk should be affected by it. On the contrary, only those exposed to the contagion have the disease. Out of autopsies on 1447 infants made by the author tuberculosis was found in 536 cases. In all these cases the bronchial glands were infiltrated. The older the children, the more frequently was tuberculosis found. If it came from milk the younger children should have it more frequently. Infants who are kept in the home are less affected than those of an age to mingle with the public. Many of the chronic coughs and asthmas of old people are tuberculous, and the disease is transmitted to the infants of the family. Prophylaxis must deal with the removal of all cases from the family, not with the care of milk and meats.

Tuberculosis of Cervical Lymph Nodes.—C. N. Dowd (*Surg., Gyn., Obst.*, March, 1909) presents his latest statistics of the result of operative treatment of tuberculosis of the cervical lymph-nodes. The report is based upon 275 cases. The results were: 54 cases followed five to thirteen and one-half years, apparent cures 98 per cent.; 42 cases followed three to five years, apparent cures 88 per cent.; eighty-seven cases followed one to three years, apparent cures 83.8 per cent.; ninety-two cases followed less than a year, apparent cures 85.8 per cent. Some patients in the list of apparent cures will develop recurrences, and most of those who now have recurrences will ultimately be cured. Of the 275 cases, 81 per cent. showed the first noticeable infection in the subparotid nodes, indicating infection from the pharynx, tonsils, or posterior part of the mouth. In most of the remaining cases the submental of submaxillary nodes were the first ones involved, indicating infection from the teeth, front part of the mouth, or face. In a few instances lupus spots on the side of the face or scalp gave infections which traveled downward through the parotid group of lymphatics. In only one instance was there an ascending infection from the arm. Of twenty-nine cases examined by inoculation and culture methods nine, or 31 per cent.,showed bacilli of the bovine type. The distribution of the inflammation, however, was the ordinary one; in every instance the subparotid nodes were the seat of maximum inflammation, indicating infection from the pharynx or posterior part of the mouth. No enlargement of the mesenteric nodes was found among these patients. Clinically, the bovine type of inflammation could not be distinguished from the human type. The virulence of the infection seemed about like that of the other cases. The indications lead one to believe that in the great majority of instances the infection comes from the lodgment of tubercle bacilli in the pharynx or posterior part of the mouth, sometimes by inhalation, sometimes from food. Among the 275 cases, 46 or 16.7 per cent. had operations for recurrence. In eleven instances the writer has excised hard nodes the size of peas or beans after operation, sometimes after watching them two or three years, and has found them hyperplastic and not tubercular. Apparently they enlarge with the extra function which comes to them after the removal of other lymphatics. In at least twelve instances they diminished in size or disappeared during a period of long observation.

Staphylococcus Infection Treated with Vaccines.—A. C. Soper, Jr. (*Pediatrics*, March, 1909), has employed vaccine therapy in twenty cases in infancy and childhood. The majority were cases of furunculosis in children of from two months to seven years. In all cases the staphylococcus was isolated before beginning the treatment. Of five cases treated with autogenous vaccine, all were cured; of fifteen to whom stock vaccine was administered, 75 per cent. recovered. In general, a small dose, such as 30 million, was given at first and later doses up to 100 million; in some older children, however, an initial dose of 250 million was given, and later 500 million.

Treatment of Epidemic Cerebrospinal Meningitis.—M. Chambelland (*Presse Méd.*, April 7, 1909), has had excellent success in the treatment of epidemic cerebrospinal meningitis by combining lumbar puncture with injections of colloidal silver into the spinal canal and normal salt solution. The symptom that is most relieved by lumbar puncture is the headache, which is immediately increased and then much lessened, so much so that the patient asks for a repetition of the puncture. It diminishes the stiffness of the neck and back and the general muscular hypertonia for some hours. Baths at 39° to 40° C. are given every four hours, lasting twenty-five minutes. They cause marked quieting of the nervous system; agitation ceases and headache is lessened. Colloidal silver is used to combat the meningococcic septicemia. The author has used it both in the spinal canal and by intravenous injection. The injections should be continued for some time after improvement has occurred in order to keep up the beneficial effect. The author gives three illustrative cases. The treatment may be outlined thus: early lumbar puncture followed by injections of the silver into the spinal canal, in dose of 5 to 10 cubic centimeters, repeated every three days; warm baths every four hours; silver intravenously after every lumbar puncture, and daily continued for a long time.

Excretion of Hexamethylenamin in Cerebrospinal Fluid and its Therapeutic Value in Meningitis.—S. J. Crowe (*Johns Hopk. Hosp. Bull.*, April, 1909) finds that hexamethylenamin, when given by mouth, invariably appears in the cerebrospinal fluid. This fact has been demonstrated by a large number of observations on man, and is also true for dogs and rabbits. The largest amount of hexamethylenamin is present in the cerebrospinal fluid from 30 minutes to an hour after the ingestion of the drug. After doses of within therapeutic limits, a sufficient amount of it appears in the cerebrospinal fluid to exercise a decided inhibitory effect on the growth of organisms inoculated into this fluid after its removal from the body. Following a subdural inoculation of dogs and rabbits with streptococcus, 60 to 80 grains of hexamethylenamin a day, given under conditions which insure absorption, will markedly defer, and in some cases prevent the onset of a fatal meningitis. In view of these observations, the prompt administration of this drug is advised in all clinical cases in which meningitis is a possible or threatened complication, or even when meningeal infection has actually occurred.

Bacteriological Diagnosis of Diphtheria.—J. E. Blake (*L. I. Med. Jour.*, March, 1909) has attempted to ascertain why the Department of Health reported negatively upon a number of cases which clinical observation and private cultures showed to be diphtheria. He finds the explanation in the fact that the Department incubates for about fourteen hours at body temperature. His own control tubes were incubated at a temperature of 75° to 80° F. and for a longer period. This method has the advantage that the contaminating bacteria grow very slowly at this low temperature, and that the diphtheria bacilli, though few, eventually outstrip the others, and are more apt to be discovered, if present. He believes that in order to reach the utmost accuracy possible, two cultures should be prepared at the same time, and one incubated at body temperature for about fourteen hours, the other at about 75° F., for a couple of days. If the first showed a positive growth, it would not be necessary to examine the second; but if the first was negative, the second would almost certainly reveal the presence of the bacilli if the disease was true diphtheria.

Resistance of the Diphtheria Bacillus to Desiccation.—Francesco Valagussa (*Riv. di Clin. Ped.*, March, 1909) has experimented on the effect of desiccation on the diphtheria bacillus by drying it slowly and then keeping it sealed in a tube in the laboratory for two years. The tube was opened every two weeks and cultures and injections were made. He found that the bacillus maintained its virulence for the entire two years. This shows that one cannot be too careful in the disinfection and sterilization of articles that have come in contact with diphtheria patients, and that the germs may be carried for a long time on the clothing of those visiting the patient or caring for him. The bearing of this fact on treatment of these cases and prevention of contagion is very important. The use of antitoxin and rapid disappearance of the symptoms of the patient should not lessen the care of disinfection after a clean culture has been obtained.

Insufficiency of the Suprarenal Capsules in Scarlatina.—V. Hutinel (*Bull. Méd.*, March 17, 1909) says that there are cases of various diseases with symptoms of marked asthenia and circulatory troubles that would indicate insufficiency of the suprarenals, and other cases in which alteration of the capsules is found postmortem. These symptoms are seen in some fatal cases of scarlatina. We may judge that they are caused by lesions of the suprarenals produced by the poison of the disease. The symptoms are marked prostration, cardiac insufficiency occurring in crises, hypotension of the arteries, tendency to syncope, and pigmentation of the skin. The author describes an interesting case in which these symptoms were relieved by the injection of small doses of adrenalin, and the patient recovered. He believes that these cases of sudden death without any apparent cause are due to lesions of the suprarenal capsules which cause the abdominal pains of which the patients complain.

Iodophilic Reaction in Normal or Icteric New-born Infants.—Eurica Mensi (*Rivista di Clin. Ped.*, March, 1909) says that the liver is the regulator of sugar in the blood, and this regulation is so perfect that the sugar content of the blood is uniform. The tendency among physicians is to regard the icterus of new-born babies as due to alteration of the hepatic cells. The proof of this alteration is given by the study of the glycogen content of the blood. Glycogen is generally found in traces in the leukocytes of the blood. These are the elements of the blood which transform glucose into glycogen, and the quicker and more active this transformation the greater is the amount of sugar in the blood. To measure the grade of transformation the iodophile reaction may be used. This is a special coloration of the leukocytes when treated with iodine, and a characteristic granulation irregularly disposed in the globules, giving from a rose to a brown color. There is a direct relation of this coloration to the amount of sugar in the blood. The author experimented on the blood of normal and icteric infants immediately after birth. Up to birth there exists the conditions capable of producing the reaction. The leukocytes in icterus react to iodine so as to show that the icteric infant has more sugar in the blood than the normal ones; that is, that the hepatic cells are incapable of transforming all the glucose introduced, and thus some is not deposited in the liver. The iodine reaction in icterus is a proof of deficient glycogenic function of the liver.

Intussusception in Purpura.—J. L. Morse and J. S. Stone (*Arch. Ped.*, April, 1909) report a case of Henoch's purpura complicated by intussusception. They say that in some instances abdominal pain, vomiting, and discharge of mucus and blood precede the cutaneous lesions or those in the joints or other mucous membranes. In such cases it is often difficult to determine whether the condition is purpura with abdominal symptoms or an intussusception. The character and onset of the pain do not help in the diagnosis, as they may be the same in both. Neither does a rise in the temperature, which is common to both. Intussusception almost always occurs before three years; purpura with abdominal symptoms is very rare before three years. Severe vomiting, especially if bloody, points toward purpura. General tenderness of the abdomen also points toward purpura, although it is often absent. The abdomen is seldom tender in intussusception except over the tumor. The presence of a palpable tumor is almost certain proof of intussusception, and practically rules out purpura. The absence of a tumor, however, does not absolutely rule out intussusception. In rare instances, moreover, hemorrhage into the intestinal wall may produce a palpable tumor. In other instances the cutaneous and other lesions precede the abdominal symptoms. In these cases the chances are much greater that the abdominal symptoms are due to the purpura and not to a complicating intussusception. The reported case and others show, however, that an intussusception may occur as a complication of purpura with abdominal symptoms, and, therefore, must be considered as a possibility. The diagnosis in these cases must rest entirely on the presence or absence of a palpable tumor, as all the other symptoms may be caused by the purpura. On this account it is wiser not to operate in purpura with abdominal symptoms unless a definite tumor can be felt.

Luys Urine Separator.—In a defense of this instrument, B. S. Barringer (*Bost. Med. Surg. Jour.*, April 22, 1909) mentions the fact that in children, the child's model of the separator, 17 F., may be used when ureteral catheterism is impossible because of the large size of the catheterizing instrument.

Congenital Muscular Atony.—Lévi-Sirurgue (*Gaz. des Hôp.*, February, 1909) describes a condition denominated congenital muscular atony as appearing in new-born infants and continuing for a varitable length of time, but being gradually recovered from unless the patient succumbs to some intercurrent disease to which, from his weakness, he is especially liable. In this condition there is hypotonia amounting to partial paralysis of all the voluntary muscles except those of respiration. No troubles of sensibility accompany this condition. The tendon reflexes are absent. The muscles of the eyes, tongue, and pharynx are not affected. There is a lessened quantitative excitability to electricity. The children are incapable of walking or standing alone, while they are very limber and may be placed in almost any position, there being abnormal motility of the spinal column. The muscles are soft and flabby. The condition is distinctly regressive. It must be differentiated from acute anterior poliomyelitis, hematomyelia, polyneuritis, pseudoparalysis, and myasthenia. The cause of this trouble seems to be a lack of development of the voluntary muscles, or an arrest of development of the medullocerebellar nervous strands. The treatment consists of electricity in the form of faradization of the muscles, baths, and massage, combined with arsenic and strychnine.

Intracranial Hemorrhage in the New-born.—J. R. Torbert (*Bost. Med. Surg. Jour.*, April 22, 1909) reports two fatal cases of intracranial hemorrhage in the new-born, confirmed by autopsy. The interesting feature was the absence of localizing symptoms, and apparently this is characteristic of these cases. Unquestionably, many cases of early death in infants which have been put down as inanition and other causes have been due to intracranial hemorrhage. In infratentorial or cerebellar hemorrhage the infants are at first generally quiet and take their nourishment, but the respiration becomes affected; accordingly we see cyanosis, irregular and convulsive breathing, and finally, owing to the formation of collateral edema of the cerebral hemispheres, general convulsions supervene and death usually occurs on the second or third day. In supratentorial or cerebral hemorrhage, which is generally unilateral, in addition to the symptoms of compression, restlessness, crying, refusal of food from the first, coma, irregular respiration and action of the heart, bradycardia, and, during the stage of excitement, vasomotor disturbances, there are definite signs of a unilateral focus, as facial paresis or spasm of the extremities, with increase of the reflexes on the opposite side, from which the seat of the lesion may be determined. When the hemorrhage is both above and below the tentorium there are symptoms of bothe categories. Confirmatory evidence can be obtained by lumbar puncture from the presence of blood cells in the meningeal fluid. This symptom accompanied by a bulging anterior fontanel is practically pathognomonic of the condition. The only hope of successful treatment lies in early raising of a large osteoplastic flap, opening the dura and clearing away the extravasated blood with salt solution irrigation. The dura is then closed, the bone flap replaced, and the wound closed without drainage.

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ORIGINAL COMMUNICATIONS.

THE MECHANISM OF OCCLUSION OF THE TUBE.*

BY
EMIL RIES, M. D.,
Chicago.

(With ten illustrations.)

Occlusion of the fimbriated end of the tube is generally considered to be due to inflammatory conditions obtaining in and around the tube. It is also generally believed that for the occlusion of the tube it is necessary that the fimbriæ turn themselves inward.

It seems simple enough to say, as some authors have done, that the tubal occlusion is the consequence of the fimbriæ becoming glued together after having been turned inward. But this statement on closer inspection proves to be circumlocutionary rather than illuminating. If we consider that normally the fimbriæ diverge from the abdominal end of the tube, it does not seem clear how these fimbriæ should turn themselves through an angle of 180 degrees inward, so that their peritoneal covering can come together and unite. There is no system of independent muscles in the fimbriæ which could explain such action on the part of the fimbriæ. The muscle fibers which run out into the fimbriæ are only the ends of the longitudinal muscle fibers of the tube, the contraction of which could do nothing but shorten and thicken the tube. Even if we take into account the fact that the longitudinal muscle fibers of the tube are arranged in a spiral in the same way as the folds of the tubal mucosa, that fact is not conducive to a clearer understanding of the behavior of the fimbriæ in the process of occlusion.

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*Read before the Chicago Gynecological Society, April 23, 1909.

The fimbriated end of the tube is an organ with an absolutely unique anatomical arrangement by the fact that here mucosa and serosa are in immediate contact, a condition which obtains nowhere else in the whole human anatomy. That might explain also why there seems to be no parallel to the process of tubal occlusion in the entire pathology and that alone should suffice to make the study of this process an attractive and important one.

The causative factors and the resulting processes which determine the intermediate stages between a normal open fimbriated end and an occluded end of the tube are summed up under the term "mechanism of occlusion of the tube" in a similar way as we speak of a mechanism of labor.

This mechanism of occlusion of the tube has attracted the attention of a number of pathologists. Three of them have deemed the subject worthy of special investigation. They are Doran (London Obstetr. Trans., 1889, Dec. 4), Kleinhans (in Veit's Handbuch 1 ed. vol. iii, 2. 2, p. 690), and Opitz (*Zeitschr. für Geburtshuelfe*, 1904, vol. lii, p. 485).

Doran differentiates between perimetritic and salpingitic closure of the tube. The first he describes as follows: (P. 353) "Perimetritis often closes the ostium by direct means. A band of adhesions grows over the fimbriæ and holds them down." (P. 357.) "A little deposit" (of bands of lymph) "covering the delicate fimbriæ as they lie on the surface of the outer aspect of the ovary is sufficient to bind them down, and then the ostium necessarily becomes closed as soon as the deposit is organized." This is accompanied by an illustration which shows a mass of adhesions which cover the fimbriæ. The latter are not turned inward.

As to salpingitic closure Doran says: (P. 357) "The ostium . . . is occluded . . . by changes within the walls of the tube which cause much swelling so that the walls bulge and close in over the fimbriæ." Page 359, he describes one of the stages of the process as follows: "The fimbriæ now lie within the tubal canal; in fact, they have been reduced to plicæ. They have not retracted—indeed, they could not retract like the tentacles of a sea anemone—the infiltrated walls have closed over them."

Both, the salpingitic and the perimetritic conditions generally take a share in closing the tubal ostium.

Kleinhans says: (P. 69) "The observation of a considerable number of specimens obtained by operation produced in us the impression as if the free edge of the tube which was enlarging in all directions was advancing gradually and was sliding over the fimbriæ like a cuff sliding toward the finger-tips. The farther this has advanced, the shorter the fimbriæ appear. The ring formed by the free edge of the tube shrinks more and more, so that in the further course of events only the fimbriated ends protrude, until on complete growing together of the ring they ultimately disappear entirely. They are then on the inside of the tube without really being turned inward, are pressed against each other, and then have an opportunity to grow together, which, however, in many cases certainly requires considerable time." This he terms the salpingitic occlusion of Doran.

Of the perimetritic occlusion he says: "The pseudomembranes formed by perimetritis press the fimbriæ irregularly against the ostium, especially in cases of subsequent shrinking. The fimbriæ need not fuse with their serous surfaces; in fact, we are inclined to consider this rare and believe that the fimbriæ do not usually fuse together until after complete occlusion produced either by the tubal walls or by pseudomembranes. In perimetritic occlusion of the tube it is therefore more correct to speak of the fimbriæ being turned inward and (especially when rapid accumulation of fluid takes place in the then occluded tube) the fimbriæ can partially apply themselves to the wall and fuse with it."

Kleinhans also mentions the fact that combinations of the two processes—the perimetritic and the salpingitic—are of frequent occurrence.

Opitz discusses particularly the way in which the fimbriæ turn inward and explains it as follows: At the fimbriated end the tube appears inserted into a slit in the peritoneum. At this point the tube is surrounded by a ring which is practically unable to stretch. Under normal conditions fluids can easily escape into the peritoneal cavity between the folds filling this ring. Under the influence of inflammation the fimbriæ become larger and pressed together by the peritoneal ring. The peritoneum can stretch to a certain extent, but the more the inflammation thickens and renders rigid the peritoneum, the less it can stretch. Thereby a functional occlusion of the abdominal end of the tube is produced. The increased secretion on the inside of the tube causes the rest of the tube to enlarge, and room is found for this enlargement by stretching of the muscular coat of the tube and by separation of the two layers of the broad ligament between which the tube can enter. The enlargement of the tube is always greatest in the ampulla, and all the neighboring tissues are drawn upon in the distention of the tube. The fimbriæ also are drawn upon to furnish material. The more the tube is distended the more the fimbriæ are drawn inward. "At last," says Opitz, "they place themselves in front of the opening so that the peritoneal covering of the fimbriæ can come into lateral contact and can fuse." This pulling on the fimbriæ *must* obtain, says Opitz, as the mucosa of the tube can stretch only very moderately in the longitudinal direction, as there are no folds running transversely. In the transverse direction the distention of the tube is taken up by the richly ramified folds. He mentions specially that "occasionally the tube is seen fairly distended, and only short ends of the fimbriæ protrude from the peritoneal ring." Still he does not agree with Kleinhans' explanation by the ring which gradually slides over the fimbriæ. The ring, he says, "does not advance, but the mucosa of the fimbriæ is gradually drawn through it."

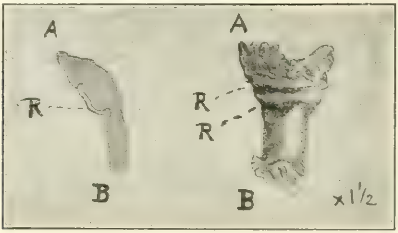


FIG. 2 FIG. 1.
Points A and B in Fig. 1 and Fig. 2 correspond

Opitz concludes by saying that his explanation does not suffice for all forms of sactosalpinx, but holds true particularly for hydrosalpinx.

After this short review of the literature, I desire to describe two specimens which are important in this connection:

The first specimen was obtained in an abdominal section performed by Dr. Gronnerud, who was kind enough to donate the specimen to me. He removed a much adherent appendix, a left hydrosalpinx of the size of a goose-egg and the right tube which interests us here. The ovaries were not removed.

This right tube (Figs. 1 and 2) shows no adhesions and is about normal-sized. At its abdominal end the fimbriæ protrude, but less than normally. There is no trace of any ovarian fimbria or of any cut surface of any. The important part of the specimen is to be observed on the peritoneal covering of the fimbriated end. The peritoneum here, instead of running smoothly, as it does normally, out to the mucosa of the fimbriæ, shows a few millimeters from the mucosa of the fimbriæ a double fold (R, R, Fig. 1) which encircles about two-thirds of the circumference of the tube and disappears toward the attachment of the broad ligament. Each one of these folds is about two millimeters wide and about three-fourths millimeter high. The folds are firm, and of whitish color. The fimbriæ show thick mucosa and protrude beyond the peritoneal edge for about six millimeters.

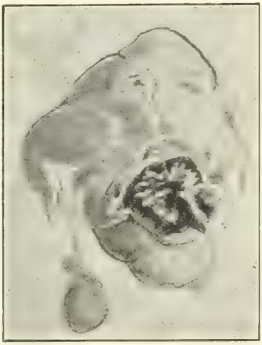


FIG. 3.

On longitudinal section (Fig. 2) the folds of peritoneum prove to consist of a whitish homogeneous tissue of about one millimeter thickness (R, Fig. 2).

Here, then, is presented a pronounced specimen of the peritoneal ring of which the authors previously reviewed speak so frequently. Also it is evident that this ring, being a double one, is pathological, as is also proven by the appearance of the tissue on macroscopic longitudinal section.

The second specimen I obtained from a woman from whom no history as to pelvic inflammations could be obtained, and on whom I performed an operation for multiple fibroids. The tumor was the size of a woman's head, and presented extensive adhesions in the culdesac. The appendages were bound together by old adhesions. The left tube was occluded and imbedded in adhesions; it was removed along with the uterus, but without the ovary. The right tube and ovary were removed with the uterus. It is the right tube which interests us here (Fig. 3).

Both tube and ovary show numerous torn adhesions. The ostium of the tube is drawn close to the ovary so that the ovary itself forms part of the ring of tissue surrounding the fimbriæ. The other half is formed by the peritoneal surface of the tube. These two form a complete ring. This ring is the rim of a funnel from the depth of which the fimbriæ arise, which protrude a little over the rim of the funnel. The fimbriæ are not attached to each other. There is no ovarian fimbria to be seen. It is to be noticed that the wall of the tube appears too large for the contents. The tubal wall surrounds the contents but loosely. The tube is not distended by any contents, nor are the folds of the tube on section packed together very tightly. The loose wall of ampulla can be slipped over the fimbriæ by the fingers until the fimbriæ disappear almost entirely.

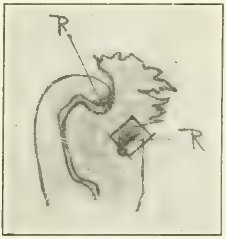


FIG. 4.—Diagram of longitudinal section of funnel. R. R. Peritonitic ring. The field enclosed in the square is shown enlarged in Fig. 10.

A longitudinal section was made (Fig. 4) through the tube and ovary so that it divided the ring of the ostium into two equal halves. On this section it was seen that the fimbriated end of the tube was invaginated to a considerable extent. The tubal wall forming the intussuscipiens showed whitish color. There was no pus or blood or other fluid contents. The microscopic section (Fig. 10) shows but little more than the macroscopic (Fig. 4) longitudinal section. It shows that the peritoneal coat of the tube, where it forms the rim of the funnel has undergone cicatricial changes (A, B, C, Fig. 10). We find here on both sides a zone of fibrous tissue (R, Fig. 4) with hyaline degeneration and poor in nuclei. The epithelium of the fimbriæ is intact. The muscular coat where it appeared so loose shows large lymph spaces and loose meshes of fibrous and muscular tissue. There are very minute foci of round-cell infiltration. The mucosa shows numerous folds with normal epithelium, considerable connective tissue and hardly any round-cell infiltration. The folds are practically never in contact with each other, the capillary lumen of the tube being quite distinct.

It remains to mention certain observations which are of more or less every-day occurrence and a short description of which will serve to establish some further landmarks in mapping out the course of tubal occlusion. Such observations are as follows:

Cases are often met with in the course of operations in which, at first, the tube appears completely occluded, but where on slight pinching of the abdominal end the tube opens up and the fimbriæ are seen (as mentioned also by Doran). The part of the fimbriæ which then becomes visible is the part lined with mucosa and in none of these observations the fimbriæ are turned inward, but they are surrounded by tubal wall similarly to an intussusception of the fimbriæ.

Completely occluded tubes are seen which are filled with some fluid. On cross-section of the tube, which leaves the abdominal end intact and allows of inspection of this part from the inside, the fimbriæ in a number of cases are seen protruding into the cavity of the tube (Fig. 9), the basis of the fimbriæ only being fused. Such cases are mentioned by Orth in his Text-book of Pathology, vol. ii, p. 541, Ed. 1893.

Cases of sactosalpinx are observed in which the outside of the tube presents the appearance of a rosette, between the rays of which distinct protrusions may appear, no trace of fimbriæ being visible on the inside.

Comparing, now, literature, the specimens presented and every-day occurrences, it becomes evident that there is very satisfactory agreement as to the actual observations, while the differences arise in the interpretation of these facts. It is also evident that the main difficulty arises over the mechanism which causes the fimbriated ends to turn from their normal position to that found in occlusion, a turn of apparently 180 degrees. As soon as any power is satisfactorily established which causes the serous surfaces of the fimbriæ to come in contact, the mechanism of occlusion of the tube in the presence of inflammation is as clear as the mechanism of any other intraperitoneal adhesions.

Doran's statement that "the fimbriæ cannot retract like the tentacles of a sea anemone" graphically expresses the impossibility of a muscular action terminating in the approximation of serous surfaces of the fimbriæ, though Klob believes that in certain cases the inversion of the ostium is primary and caused by an abnormal contraction. But Doran's statement that the infiltrated walls close over the fimbriæ does not elucidate how it comes that the fimbræ actually are found with their serous surfaces fused. Nor does Opitz's very plausible theory explain how it is possible to find the fimbriæ protruding on the inside if they are used up in the distention of the wall in order to be drawn in. Nor does Opitz's theory agree with Kleinhans' description and my case 2 (Fig. 3) which show an intussusception-like condition rather than a drawing-in of the mucosa only. Kleinhans makes a very accurate observation when he says that after the peritoneal ring has closed over the fimbriæ they are not really turned inward. But he is less clear when he goes on to say that the fimbriæ are then pressed together and have an opportunity to fuse. Why should they fuse if they are only pressed together with their mucosa surfaces? It matters little whether the peritoneal

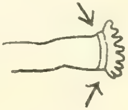
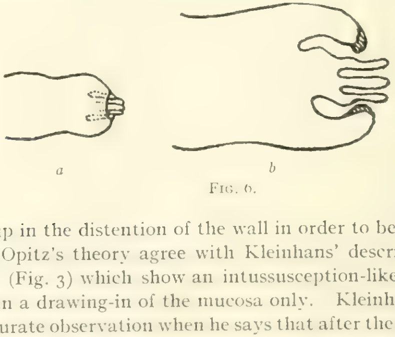


FIG. 5.



a *b*

FIG. 6.

ring migrates over the fimbriæ, as Kleinhans states and Doran suggests, or whether the fimbriæ migrate through the ring, as Opitz says. Neither theory explains the inversion of the fimbriæ.

Klebs mentions the fact that inflammations limited to the fimbriated end occur frequently and lead to shrinking. Afterward the free tubal end becomes contracted by new-formed connective tissue in the serosa, inversion of the fimbriæ and occlusion or stricture. This description expresses succinctly the condition of the ring which our two cases presented, though it fails to give an explanation of the inversion of the fimbriæ.

If we may attempt a description of the mechanism of tubal occlusion from the foregoing, it must be stated at the outset that it is impossible to sharply differentiate between a perimetritic and a salpingitic occlusion. There is no perimetritis or rather perisalpingitis (Doran states that he uses perimetritic here in the wider sense) without salpingitis and there are no cases of salpingitis which do not at some time or other—if the patient lives—produce perisalpingitis.

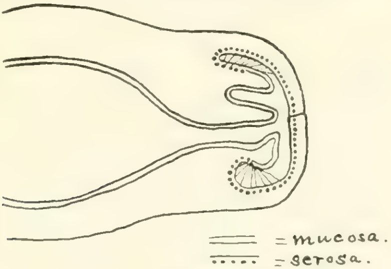


FIG. 7.

The infectious contents of an inflamed tube escape through the abdominal end and we find, therefore, here the oldest changes in the peritoneum. Here we find the chronic thickening of the serosa as described in the above two specimens and which can be demonstrated microscopically (Fig. 10). This makes a peritonitic ring around the ostium out of a peritoneal ring. The ring need not be a complete one, part of the ring may be formed by any organ that the contraction of the peritonitic scars brings together. These peritonitic scars like all peritonitic scars on hollow organs have a tendency to contract (Fig. 5). The escape of fluid from the tube is thereby impeded, the swollen folds of the tube have not sufficient room, the tube becomes dilated, the wall of the tube becomes stretched. The fibrous cicatricial ring gives less than any other part; therefore, the muscular coat and its serosa become stretched more than the ring around the ostium. With the inflammation subsiding, as tubal inflammations so frequently do, the contents of the tube are absorbed or discharged in one direction or another, the swelling of the folds subsides, the walls become too large and loose (as in my case 2). The peritonitic ring thereby gains in mobility and can contract further over the fimbriæ. The fimbriæ escape being pinched by the ring, or, rather, the fimbriæ being covered with epithelium cannot adhere to the peritonitic ring and escape inward without inversion (Figs. 6a and 6b). The ring can now close completely, and we have a closed tube. The union of the peritonitic ring is a seroserous one, and is therefore—when recent —not very firm, so that by squeezing it, we can force it open and see the fimbriæ inside, as all

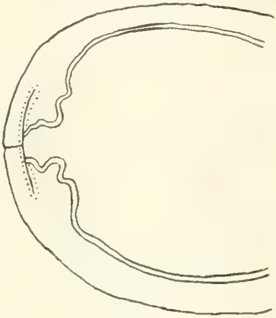


FIG. 8.

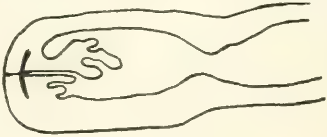


FIG. 9.

of us have done and as Doran describes. At this stage the septic contents of the tube extend into the channel between the mucous surfaces of the fimbriæ. The remnant of peritoneum on the inside of the funnel (Fig. 7) and on the serous surface of the fimbriæ being in a condition of peritonitis, the peritoneal surfaces can fuse with each other in many conceivably irregular ways, while the mucous surfaces of the tubal fimbriæ being covered with epithelium do not fuse (Fig. 8). The remnant of the cleft between the mucous surfaces of the fimbriæ is then sometimes seen as a small dimple on the inside which leads to an obturating membrane, the original peritonitic ring. The fimbriæ are now bunched on the inside of the tube, not really inverted (Fig. 8). But if the fluid contents of the tube are again absorbed or discharged into the uterus and the tube collapses, the fimbriæ cannot open again on account of the peritonitic adhesions outside, but the bundle of fimbriæ can become more prominent on the inside now (Fig. 9), because the distention has stopped, and then such specimens as Orth mentions can be obtained.

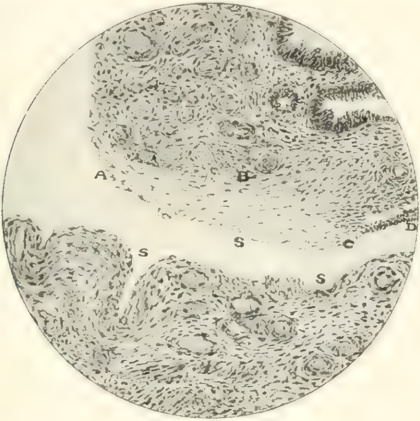


FIG. 10

A new dilatation of the tube will then tend to flatten out all folds of the mucosa, and if the sero-serous union between the fimbriæ is strong enough the unyielding lines of fusion will stand out like the radii of a rosette.

Certain objections might be raised against this explanation, as for instance the fact that repeated attacks of salpingitis are required in this explanation. As a matter of fact, it is just the chronic cases which have passed through repeated attacks of pelvic peritonitis which present these occlusions. Single attacks of salpingitis usually result in a few adhesions only, if the patient survives them. Also any attack of salpingitis, if at all protracted, may in itself contain all of the possibilities required in the above theory.

Another objection which might be raised is contained in the question: what becomes of the ovarian fimbria? If there is an ovarian fimbria, how can a peritonitic ring close over all fimbriæ, unless the tube is found attached to the ovary in every case, which it surely is not. Of the above-described two specimens neither one had an ovarian fimbria and, if a sufficiently large number of fimbriated ends is examined, it is invariably found that this ovarian fimbria is by no means a constant organ. It may be true that persons provided with an ovarian fimbria may be immune against the mechanism described here. Doran mentions (page 360, l. c.) that "in advanced cases the ovarian fimbria becomes reduced to a thin band.' It seems from this that Doran found the ovarian fimbria awkward to overlook, when he assumed that the walls of the tube close over the fimbriæ. But it is not necessary to agree with him as to the reduction of the ovarian fimbria to a thin band in advanced cases, if it is taken into account that the ovarian fimbria is normally a very unstable organ.

Our whole explanation, as is seen from the above, is based on processes other than the supposed inversion of the fimbriæ as an active process. The forces which may ultimately land the fimbriæ on the inside of the tube are the well-known contraction of peritoneal scars, the tendency of inflamed peritoneum to coalesce with similar surfaces, dilatation and evacuation of the tube. In short, we have found in this apparently unique pathological condition of an unique organ in the human anatomy no forces which are not well known and generally recognized. The study of the mechanism of tubal occlusion will render more interesting specimens which are now generally discarded. With some further study of these cases it should be possible to furnish even more complete successive stages of tubes going through the process of occlusion than have been described here.

100 State Street.

CONSTIPATION IN WOMEN.*

BY

ALFRED D. KOHN, M. D.,
Attending Physician to Michael Reese Hospital, Chicago.

It is the opinion of many writers on gynecology that chronic constipation is a potent etiological factor in diseases of the female genital tract, and it is therefore timely that this well-worn topic should be considered in a meeting of this kind.

Chronic constipation, as we know, is one of the commonest of human ailments, yet in spite of its great prevalence it is for many reasons peculiarly intractable to treatment. To begin with, constipation is a disease of the large intestine only, but what is perhaps *not* so well known is that it is frequently confined to only a limited portion thereof, and it is therefore the physician's task to ascertain *which* part of the bowel is affected before instituting treatment. This can best de bone by ordering the patients to report for examination before the bowels have been emptied in order that the physician may determine by physical examination, as nearly as possible, the exact anatomical location of the fecal accumulation. The commonest form of chronic constipation is of the sigmoidal variety, and, as we shall see farther along in the discussion, the most fertile cause of pelvic complications in the female. This form is also the easiest to localize, by digital examination, for it is in this class of cases that the percussion note is dull over the sigmoid and in favorable cases for palpation fecal masses may be felt through the abdominal wall.

In constipation due to *rectal* disease, examination through the rectum discloses feces, and at the same time frequently reveals the cause of the constipation, as, for example, either a flaccid muscle lacking sufficient propulsive force or a tightly contracted sphincter which acts in the nature of a mechanical bar. When the constipation is located farther up, as, for example in the neighborhood of the cecum and ascending colon, percussion over the affected area gives a dull note, whereas in the same case percussion over the sigmoid region elicits tympany. Further, such classes of patients give a history of receiving no benefit from enemas, even if used frequently and in large amounts, and state that the wash water comes away clear or only slightly stained with feces. As a result of the continued use of larger and larger quantities of warm water in these cases the lower bowel is often mechanically dilated to such an extent that even when the trouble farther up is corrected, the musculature of the rectum lacks proper force to expel the stool.

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* Read by invitation before the Chicago Gynecological Society, April 23, 1909.

It has long been customary to divide constipation into two distinct varieties—the atonic and spastic. It seems to me, however, that this is an arbitrary and incorrect classification for the reason that the spastic variety may coexist with the atonic species in the same case, and is not properly a distinct form of constipation at all, even though generally recognized as such. It is best to consider it a part and parcel of a somewhat different variety of the same disease, and its mucous accompaniment something quite different, namely, a true colitis. If spastic constipation complicating mucous colitis were a pathological entity, the rectum and colon would not show the characteristic changes which we are able to discover through the use of the sigmoidoscope, for with the aid of this instrument we can readily see redness, thickening, and other pathological changes in the bowel. Patients suffering from this disease frequently pass large quantities of mucus of various consistency, blood-stained, but without a trace of stool. Mucous colitis, moreover, though dependent for its etiology on the same causes that bring about spastic constipation, may persist for a long time after the constipation and its attendant causes having disappeared and usually requires local treatment long afterward. Though constipation, as has been stated, is a disease of the large bowel, we must not forget that the central nervous system is also often at fault, and that faulty innervation is frequently the cause of the most intractable constipation. A large number of the cases that recover from constipation in sanatoria, or rest cures without drugs is a case in point. In addition, we must not lose sight of the fact, as I pointed out in a previous paper on this subject, that many stubborn cases of chronic constipation yield to Christian Science and similar mental impressions, though there is a physiological reason for success in this class of cases which we will take up at this time.

Individuals who eat too easily assimilable food have in consequence too little waste matter to furnish the necessary internal stimulus to the mucous membrane of the bowels to bring about contraction, and are hence constipated. We know also that in a large number of cases a coarse diet alone is sufficient to furnish the necessary internal stimulus to peristalsis. This accounts for the fact that many constipated individuals, who in their despair have embraced Christian Science are often astounded when they let themselves alone for a few days to find that their bowels move of themselves, and are only too prone to attribute the results to the Good Book. As a matter of fact, however, they are merely furnishing the necessary mucous stimulus for the innervation by withholding enemas and cathartics and at the same time giving sufficient food for the bowel to work upon, and withdrawing the large nervous element which is present. While we are on this subject we may mention other nervous impulses which work for and against bowel movements. The nervous mechanism of the bowel is far from being the simple process which we are taught. In a healthy person with an unimpaired nervous system it is, of course, simple enough to say that when the sigmoid and upper rectum is overloaded with stool, an innervation automatically goes out from the sacral ganglia and is followed by contraction of the sigmoid rectum and with it their contents. Yet we have only to bear in mind how well we can control bowel movements to understand the great rôle played by the mind in controlling this all-important function. We have but to remember the effects of anxiety, fear, and other mental processes to understand how complicated the process is; and we must in addition keep in mind that every part of the large bowel must be properly innervated in order to keep up the peristalsis necessary for regular daily evacuations. It is not properly understood exactly how this innervation works. It is undoubtedly true that the contact of the fecal mass with the interior of the bowel is the first requisite to the nervous energy which results in the wormy forward movement which we call peristalsis. This force must be exceedingly complicated in order to bring the stool forward in its journey toward the rectum, as is evidenced by the fact that only a small given portion of the bowel must contract strongly over the stool, whereas the portion directly below must relax to receive it. Then, while the first portion must expand to receive the stool directly behind it the second part must in turn contract to force its portion onward. Now, if with a delicate mechanism like this one small part should fail to perform its function properly—that is, fail to contract—stagnating masses of feces gather in various portions of the bowel, depending on their location partly on chance, partly on inflammations of the adjacent organs. It is now a well-established fact that old inflammations about the appendix and gall-bladder are frequently followed by partial paralysis of the adjacent bowel, and, as we shall see, inflammations about the adnexa and bladder bring about similar results. Why, however, these conditions are followed now by the ordinary atonic constipation and again by the so-called spastic variety is more difficult of explanation. Perhaps the result depends largely upon the acuity of the underlying causes or perhaps central nervous irritability plays a great rôle in determining whether the bowel is tightly contracted over the stool or flaccid, as in the atonic variety. If tightly contracted over the scybalæ, the irritation of the indurated masses will account in some measure for increased mucus in the stool and also for the small caliber thereof. If the inflammation is of the more virulent variety, with repeated exacerbations, it is more likely to be followed, especially in neurotic individuals, by so-called spastic constipation; otherwise, by the atonic form. When the bowel is partially paretic as a result of inflammation in its neighborhood, there is, of course, less likelihood of the formation of mucus.

The causes of chronic constipation in women may be summed up somewhat as follows: Sedentary life, simple laziness, false modesty, tight lacing and improper dress, defective innervation of the nervous mechanism—whether central, as in neurotic and hysterical subjects, or local, following the continued use of purgatives and too easily assimilable food; or adhesions as a result of localized peritonitis, as in appendix and gall-bladder disease; weakness of the abdominal muscles as a result of repeated pregnancies, such as diastasis recti and pendulous abdomen, or lacerations of the pelvic floor from the same causes. In addition, a large number of cases are on a hereditary basis, and in others there is the interesting condition to which Strassburger first called attention, of individuals in whom the digestion is so strong that very little residue is found in the stool even after partaking of the coarsest foods, richest in cellulose. Painful conditions about the rectum, such as fissures, hemorrhoids, and the like, tend to overload the bowel above, with the complications resulting therefrom; occasionally also, as Pantzer suggests, a hypersensitive left ovary and the various pelvic inflammations may bring about chronic constipation by causing spasticity of the rectum and the retrouterine ligaments. Lactation with its consequent drain on the system frequently is a causative factor. Retrodisplacements alone cannot, as Dr. Lucy Waite rightly suggests from the results of examination of 500 cases, cause chronic constipation (unless complicated by inflammatory adhesions, she might have added. A. D. K.). Congestion of the neighboring organs during the menstrual period may, according to Harriman, cause constipation as can the climacteric, during which period the fugitive abdominal pains and the general nervous condition naturally lead women to shun any act which would tend to increase their distress; and thus many become habitually constipated through neglect and carelessness. Again, prolapse of the uterus and posterior vaginal wall or neoplasms of the uterus mechanically interfering with the act of defecation may bring about constipation. A form of rectal constipation hitherto little recognized is that which follows as a result of the pulling down of the rectovaginal septum followed by a rectocele, constantly changing in size and changing the direction of the intraabdominal rectal pressure to that of the vaginal which is at right angles to it, thus making it difficult for the rectal sphincters to relax sufficiently to empty the contents of the bowel, with the result that complete defecation is impossible. In severe cases of parametritis, as Kuliga, Rothrock, and Nieberding report, chronic ileus may result from stenosis of the rectum following posterior parametritis.

Now, as to the frequency, Currier found that in his practice 65 per cent. of all women suffered from chronic constipation, while Arthur Mueller believes that 90 per cent. of all inflammatory conditions in the female pelvis are due to bowel disorders, especially habitual constipation. This explains a large number of female disorders in women who have not suffered from gonorrheal or other genital infections, and such cases as frequently occur in virgins during the menstrual period and are attributed to various causes, as catching cold. According to Mueller, as a result of fecal impaction, infection may travel slowly from the mucosa to the serosa of the bowel, and finally have as its sequence, if the process is uninterrupted, para- and endometritis and oophoritis. If, on the other hand, the process extends to the cellular tissues around the rectum, it may give rise to periostitis of the sacrum with sacral neuralgia, or involvement of the pelvic nerves with a resulting sciatica. In addition, he maintains that chronic constipation can cause nearly every other pelvic disease that unfortunate womanhood is heir to; so that if we were to take this author literally we might with propriety suggest that the gynecologist may as well exchange his armamentarium for a rectal douche bag and a stock of cathartics.

When we approach a subject as complicated as pelvic disease accompanied by chronic constipation, we are much in the position of the clinician who attributes gastric ulcer to anemia because he finds that nearly all sufferers from ulcer are anemic. Yet it is more likely that the bleeding ulcer caused the anemia than that the anemia caused the ulcer. We must not lose track of the fact that it is just as easy for inflammatory conditions to extend from the genital organs to the bowel as from the bowel to the genitalia. Villard, for example, found that where inflammatory conditions of the genitalia were complicated by constipation, that medical treatment of the bowel trouble caused only temporary relief from the pelvic disease, and that only after removal of the inflamed organs was a complete cure effected, his experience in this class of cases being analogous to those in which removal of the gall-bladder and appendix was necessary in cases in which these organs were a causative factor in the production of habitual constipation.

Currier found accompanying constipation in pelvic diseases in two-thirds of all his cases. It is his experience almost invariably to find feces in the rectum of women who come especially prepared for bimanual examinations, and he attributes this common finding to lessened sensitiveness of the female rectum. Pelvic disease may, according to him, cause constipation in women either by pressure, as by a gravid uterus, or myoma, or by direct extension of inflammatory conditions to the sigmoid and rectum which become involved in a mass of adhesions, thus becoming either fixed or paretic. It is a common experience also that all of these troubles become aggravated at the menstrual period.

The infection extending to the neighboring bowel can also, according to Marchius, cause a proctitis, periproctitis and mucomembranous catarrh, and give rise to alternating periods of intestinal paresis and fetid diarrhea.

The effects of chronic constipation in women are either constitutional or local or both. Locally, in addition to the symptoms which we have already discussed, we may mention the fact that long-standing fecal accumulations may force the uterus forward against the bladder and cause irritability and hypersensitiveness of that organ. Fecal impaction often aggravates menorrhagia, metrorrhagia and leucorrhea by producing general pelvic congestion. The reflex effects of chronic constipation are numerous, and under this head may be mentioned dysmenorrhea, ovarian neuralgia, gastralgia, and numerous hysterical manifestations. Rarely, amenorrhea may result, and Pantzer reports such a case, in which the chronic constipation was further complicated by anal fistula. As a result of habitually straining at stool, hernia may also occur. Perisigmoiditis, if accompanied by an abnormally long mesentery, is, according to Pennington, especially liable to result in abnormal fixation of the uterus with increased susceptibility to infection. In such cases the patient is prone to seek relief from the secondary pelvic condition. The records of Byron Robinson bear out the frequency of this condition. In 800 autopsies (600 men and 200 women) he found adhesions about the sigmoid in 80 per cent. of the men and 85 per cent. of the women. This is in accord with Pennington's observations, who reports that more than 75 per cent. of all the adult women he examined for rectal or sigmoidal disease had some uterine disorder in addition. The constitutional effects of chronic constipation in women are malnutrition and anemia, and of the anemias, especially chlorosis, the results undoubtedly of copremia. Less frequently albuminuria and cylindruria occur. The central nervous system is frequently deeply affected, and the patients become hypochondriacal, neurasthenic, and hysterical, with all that implies. Dyspepsia is common, mostly in the form of hyperchlorhydria, and the symptoms frequently disappear when the constipation is removed. Dizziness is a frequent and troublesome symptom, as is palpitation. The latter is either on a nervous or a mechanical basis, due to gas pressure. Dizziness, however, cannot be dismissed so lightly.

It is usual to attribute this very common symptom to absorption either of gases or toxins. It is no doubt true that when the bowels are regularly emptied that the number of bacteria in the intestinal tract is less than when the stool stagnates. However, this question has as yet not been scientifically worked out, and until it is we can only guess at the amount of bacteria produced relatively by fluid and hard stools and the constitutional results therefrom. If the stool is very hard, of course the continuity of the mucous membrane of the bowel is more likely to be disturbed than in the presence of a softer stool. However, unless the mucous-membrane surface is made permeable for bacteria, it is hard to see why there should be as much absorption from dry as from fluid stool. What, then, causes the dizziness in constipated subjects? In my opinion it is either the result of the imagination following years of false teachings, or, what is more likely, it is due to pressure. There are numbers of people who, when examined vaginally or per rectum, complain of a certain giddiness. Such subjects are, in my experience, the ones who complain of dizziness when they do not have a regular daily bowel movement. Whether the pelvis of such patients is more richly fed with nerves than in the average person or whether they lie nearer to the surface, it is impossible to do more than suggest theoretically, as a solution for a condition which cannot be explained so well on the absorption theory, for, as already stated, absorption from dry stool is less likely to occur. The best explanation of this very common condition in constipation in cases where dizziness from pressure may be excluded is that it rests entirely on a mental basis. The average person whose bowels fail to move daily expects to be dizzy, and as a result is rarely disappointed.

Headaches, one of the commonest symptoms accompanying chronic constipation, can be accounted for partly on the theory of intoxication, and partly as an accompaniment of the general nervous condition, which we find in many such subjects. Bad taste in the mouth, another common symptom, is due in a large proportion of cases to buccal disease and in rarer instances to absorption of toxins and exhalation of the same through the lungs.

Treatment.—The treatment of chronic constipation is dietetic, mechanical, and medicinal. There are a certain number of cases which can be improved by diet alone, and it is generally conceded that food rich in cellulose and other waste matter is useful in a large proportion of cases. Best of all is a pure vegetable diet, combined with cooked fruits and coarse cereals. To these we may add certain chemical stimulants, such as common table salt, fats, best taken in the form of butter or olive oil, if the latter is well borne, sugar of milk, and malt marrow. If we are still unsuccessful, we may make a trial of the various bulky mechanical stimuli to the intestine, such as bran, vaseline, if it can be taken, and even sand. Rosenheim gives a teaspoonful of the last in half a tumbler of cold water in very stubborn cases; and, he says, with good results. However, I myself have never had the hardihood to go as far as that. If all these dietetic schemes fail, we resort to various mechanical means before trying medicines, and find them valuable adjuvants to the diet in a number of cases. Of these, the best are rectal electricity given three or four times a week with the abdominal pad localized over the affected area. Any kind of rectal electrode may be used and the treatment given for ten minutes. Faradization with an interrupter is the most effective in bringing up the tone of the bowel in atonic cases, whereas in spastic conditions galvanization carefully applied with the anode in the rectum is often beneficial. Other means, such as massage of the diseased portion of the bowel, cold sprays either of ether or ethyl chlorid may be of assistance. In stubborn cases oil injections or cool salt water, the last especially when the sphincter is weak, may be added.

With the aid of all these methods, singly or combined, we are often able to achieve lasting results and gradually let our patients go back to their normal method of living. If, however, as often occurs, the patient drifts back to his old state as soon as the treatment is stopped or often in spite of all treatment, we have to call into requisition the various cathartics. If a patient were compelled to keep up such complicated treatment as I have outlined ndefinitely when he could achieve the same results by the use of a little harmless medicine, I think a sensible person would stick to the drugs. However, it is only after most medicines have lost their effect that patients come to us for treatment, and we are usually doing nothing new for them when we prescribe medicines. There are, however, a number of new drugs which are not yet popularly known, but very effectual, which we may enumerate. First and foremost, regulin, which is merely agar impregnated with cascara, and para-regulin, which is paraffin similarly prepared. These are best given in quantities varying from a tablespoonful down, mixed with potato or apple sauce. Then purgen, of one of the three strengths, follows next in order of usefulness, but cannot claim the harmlessness of the above-mentioned compounds. Finally, cascara, best given in doses of thirty drops three times daily, and gradually decreasing to the minimum necessary in the given case. Lastly, the various home remedies like senna and figs or senna and rhubarb often prove for a long time effectual; or aloin, which may be taken for years without harmful effect. What I wish to make clear, therefore, is that there is a certain proportion of cases in which we cannot get along without drugs, at least such has been my experience and the experience of many others, and it is, therefore, extremely important that we should not allow ourselves to be deceived by temporary success in any given case that improves without drugs.

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PUERPERAL SEPSIS.

Its Pathology, Clinical Course, and Treatment.

BY

HERBERT MARION STOWE, M. D.,

Associate in Obstetrics, Northwestern University Medical School; Attending Obstetrician to Cook County and Provident Hospitals; Assistant Obstetrician to Wesley and the Chicago Lying-in Hospitals.
Chicago, Illinois.

(With eight charts.)

In spite of the great advances made in the study of puerperal sepsis during recent years, the maternal mortality has been but slightly reduced. The reason therefor is not far to seek. Many obstetric deliveries are still being handled by midwives and "others" who have but a faint conception of modern surgical technic. To these must be added the many cases arising from criminal abortion. Criminal abortion is certainly on the increase, especially in our larger cities. Not only the midwife, but scores of people in various walks of life think nothing of passing instruments into the uterus in order to terminate gestation without the slightest attempt at antiseptic precautions or the warping ot their perverted consciences. The unaccountable reticence of the patient, even when dying from the effects of a septic abortion, and the difficulty of proving a case against the operator in court have emboldened these abortionists to such an extent that the graveyards are becoming populated with their unhappy victims. It is a matter of general knowledge that the physical condition of womanhood has deteriorated during the last fifty years. The changes in the manner of living, the lack of physical exercise, and the method of dress in vogue at the present time illy equip the pregnant woman for the coming trial of parturition. Obstetric dystocia is increasing to a marked degree. Delivery is rapidly becoming a pathological phenomenon. The strength of the patient is exhausted by the efforts put forth in the first stage of labor and a forcep extraction becomes necessary to save the fetus from a fatal asphyxia. Accompanying these intrapelvic and intrauterine manipulations are the resultant tears and lacerations of the soft parts, and the danger from hemorrhage and sepsis is greatly increased. The deteriorated condition of the mother at the time of delivery causes increased anxiety to both patient and medical attendant.

It is, therefore, essential to study and understand thoroughly the pathology of the various types of puerperal sepsis and to carry out a line of treatment that is based upon that pathology, a treatment that has been proven by abundant clinical experience to be productive of success. Treatment by empiricism is permissible only when the pathology is in doubt. When the pathology is determined, scientific medicine demands a treatment whose essentials are governed by the abnormal findings detected in the case under consideration. The time has passed when the progressive surgeon follows a treatment highly sanctioned by the older authorities unless it is based upon a definite physiological and pathological groundwork. The older authorities did yeoman service with the knowledge of medicine then extant, but it should hardly be expected that the older treatments should be retained in view of the more recent discoveries and the modern facilities for clinical and microscopical investigations obtainable in our scientific laboratories.

There is a lamentable effort on the part of many physicians to classify all the forms of fever under one head—puerperal sepsis—and treat them all alike. We are aware that some patients will recover after certain treatments have been given and we are certain that many apparently serious cases will recover without treatment of any kind. We need to be guided by the microscope and the laboratory findings in cases of puerperal sepsis and divide the patients into the various groups. We cannot claim cures in septicemia unless we have found the streptococci in the blood. The value of our conclusions depends entirely upon the accuracy of our clinical and microscopical diagnosis.

It is the purpose of this paper to discuss the pathology, clinical course, and treatment of some of the more important forms of puerperal sepsis, beginning with infections of the vulva and following the process along the birth canal.

Attention is directed to those common forms of sepsis that remain localized throughout their course and tend to spontaneous recovery. The entire mucous membrane of the birth canal from the vulva to the external os uteri is bruised and congested in every labor. Small lacerations or abrasions of the surface or tears extending deeper into the tissues become infected by the cocci present in the lochia and undergo an inflammatory reaction.

These wounds are rapidly transformed into puerperal ulcers. Their bases are covered with a dirty, yellowish-gray fibrinous exudate which, in severe cases, becomes almost black in color. It is firmly adherent to the underlying structures and an early removal is always accompanied with hemorrhage. The edges of the ulcer are swollen and congested, usually ragged in outline. When multiple or of large size, the purulent secretion is profuse and has a peculiar odor. In the immediate vicinity of the ulcer, the parts are hyperemic and swollen. Edema is common and may extend to one or both labia and the perineum. If situated in the anterior portion of the pelvic outlet, the swelling may press upon the urethra and cause ischuria. This occurs after the third day of the puerperium. If the infection is severe, these ulcers spread until the mucous membrane of the vagina and the skin of the vulva and perineum slough off. If the deeper structures are involved and the circulation of the part becomes stagnated, gangrene may set in. Large areas of tissue are thus destroyed and fistulæ form communicating with the rectum or bladder. Stenosis of the vagina may follow and call for the performance of Cesarean section at a future delivery. Shortly after the formation of the necrotic layer of fibrin, an active infiltration of the underlying tissues with leukocytes occurs and prevents any further entrance of the bacteria into the body. This granulation wall, when fully developed, definitely limits the degenerative action of the infective process. At the end of a week, the necrotic layer is thrown off and the active granulation area is covered with cells proliferated from the sides of the ulcer. At the end of the second week, the puerperal ulcer has become covered over with regenerated epithelium and the continuity of the vaginal mucosa is restored.

These puerperal ulcers are more common in primiparous women. The swelling occurs on the first day after delivery, rarely later. The patient complains of little pain and is only disturbed by the edema and swelling of the parts. Fever is absent or of slight duration. Diagnosis is made by inspection if the process is located in the lower portion of the birth canal and by palpation with the finger if situated more internally.

Inasmuch as these ulcers tend to spontaneous recovery within two weeks, an active therapy should be prohibited. Instrumental or digital examinations as well as frequent douching are apt to produce abrasions and interfere with the development of the granulation wall of leukocytes. Unnecessary manipula tion of the tissues may be followed by added infection as a result of the penetration of the wall and entrance into the system of the cocci and their toxins. In the great majority of cases, all that is necessary is external irrigation with a 1/2 per cent. lysol solution and a sterile or antiseptic gauze laid between the labia. If deep vaginal ulceration is accompanied by profuse and foul discharge, frequent irrigations may become necessary for the sake of cleanliness. If gangrene is threatening, the tissues may be touched with a 50 per cent. solution of carbolic acid or pure tincture of iodin. A very valuable caustic consists of equal parts of 95 per cent. carbolic and tincture of iodin.

In the uterine cavity we find after every delivery certain portions of decidua retained, at times placenta. In the afebrile puerperium these fragments undergo fatty degeneration, become swollen and thickened, and are usually expelled by the fifth day postpartum. On the third day it is possible to remove all the tissues down to the muscularis with a gauze sponge. If the uterine cavity is infected *ab initio*, the septic contents of the lochia can infect every atrium existing in the lower birth-canal. If the infection is an ascending one, the infecting agent, usually the streptococcus, can extend from a necrotic ulcer of the perineum to the fundus uteri within twenty-four hours or even less time.

In the putrid form of endometritis the decidua becomes grayishwhite in color and its thickness varies greatly The entire contents of the uterus—blood-clots, decidua, and placenta—soon become the feeding-ground of saprophytes introduced from below. The method of natural protection against infection in the uterine cavity is similar to that against the puerperal ulcer. The granulation wall of leukocytes, so classically described by Bumm, occurs early in the disease and is associated with a proliferation of connective-tissue cells. The more serious and rapid the infection, the less completely is this wall developed, and hence a greater liability to further extension exists. If the infection is sapremic only, the process is local and the danger of general poisoning is small. As long as the leukocyte wall is incomplete and the maternal organism has not yet overcome the infective agent, the lochia is small in amount and thin and serous in character. When the protection is adequate, the lochia is free and rich in pus-cells. An early and markedly purulent lochia is a favorable sign. This lochia is dark brown in color and contains few if any cocci. Infection of the putrefying mass by saprophytes is productive of the foul odor characteristic of this type of sepsis. The saying is true that a stinking lochia betokens a favorable prognosis.

If the infective agent is the streptococcus, a further extension is to be expected. This organism is able to enter the tissues of the placental site within a few minutes after implantation so that no intrauterine douching or curetting can remove it. If saprophytes are absent in the uterine cavity, the lochia has the normal color and odor. It contains numerous streptococci and staphylococci.

Clinically, the symptoms of putrid endometritis are few in number. The diagnosis is made by the lochia, foul in odor, usually profuse and purulent, and containing few streptococci. The uterus is somewhat enlarged and painful on pressure. A microscopical examination of the blood by smear and culture for the presence of streptococci is negative. There are no signs of involvement of the parametrium or peritoneum. While in isolated cases the fever may be high, it seldom rises over 102° F. The pulse is moderately increased. The general condition of the patient is excellent. Her sleep, appetite, and bowels are but little affected. The important point is to differentiate between sapremia and septicemia.

The presence of decomposing material in the uterus accompanied by foul odor usually settles the diagnosis of sapremia, and the physician should endeavor to prevent the spread of the infection. The great majority of incomplete abortions fall under this heading. If a woman not over four months pregnant aborts and she is seen within twenty-four hours after, before the granulation wall has had time to form completely, the uterus may be curetted free of all débris. It is to be remembered that it is practically an impossibility to remove all the decidua with the curette. The danger of curetting too deeply and of perforating the relaxed uterine wall should ever be kept in mind. An expert or one accustomed to instruments may use a sharp curette but others should use the dull or wire instrument. If seen after two or three days, only a finger curettage should be allowed and the large or partially detached fragments removed. We should exercise great caution in this operation and prevent unnecessary injury. If the patient is first seen four or more days after an abortion, presents a moderate fever, moderate increase in pulse, and profuse lochia, no local treatment is necessary and the author, has seen many of these patients recover. He has also seen several die after a thorough curettage. An empty uterus should not be touched. No patient should have a second curettage performed. Only the presence of blood-clots, placental tissue and, in certain cases, portions of membranes calls for their removal with the finger or douche. In many cases it is possible to expel the uterine contents by compression of its walls without actually entering the cavity. The farther advanced the pregnancy, the more dangerous is the curette.

It is impossible to sterilize a septic uterine cavity by irrigations with any known antiseptic, as the cocci have passed beyond that stage long before the diagnosis has been made or the patient complained of being sick. The only use of the douche is to remove loose fragments and blood-clots, and this irrigation should be administered but *once*. Repeated irrigations are pernicious. Where improvement follows their use, it will be due to the fact that the maternal resistance has gained control over the invading organisms in spite of the douche. It is also impossible to sterilize the septic uterine cavity with the curette. During the operation a large number of cocci are removed, but many remain and their propagation and virulence are materially increased, so that a few hours later the amount of infective material, while materially reduced, produce toxins of higher virulence and more destructive tendencies than ever. The main object of the curette is to prevent sapremia and, by removing decidua and placenta, promote uterine retraction and involution. The time for the curette is before the granulation wall has completely shut out the infecting organisms from the maternal circulation or lymphatic system. Inasmuch as uterine retraction is imperfect in the presence of sepsis, ergot and hydrastis should be given in sufficient doses to secure results. Extension of infection is uncommon in the presence of firm uterine contraction and retraction.

Another important point is the securing of free drainage for the lochia. While lying flat in bed the lochia is apt to collect in the posterior vaginal fornix and form a breeding-place for the germs. The early use of Fowler's position will overcome this difficulty. Many cases of febrile puerperium can be overcome by securing free drainage of the lochia and by promoting uterine retraction. It is an excellent practice to place the patient in Fowler's position when the lochia becomes scanty during the first ten days of the puerperium.

CASE I.—*Sapremia. Recovery.* Kate O'R. Aged thirty-four years. This patient entered my service in the Cook County Hospital, June 9, 1908. She had been delivered of her fourth child three days previously. The labor was spontaneous. The placenta was expelled by Credé's method and was stated to be complete. A moderate postpartum hemorrhage followed Upon her arrival at the hospital it was thought best not to examine her internally as there was considerable risk of developing an infection. The uterus was large and a few clots of blood were expressed by external manipulation. The patient was placed on ergot and hydrastis and put in Fowler's position. On the third day the temperature rose to 100.2° F. An ice-bag was placed over the hypogastrium and double the amount of ergot given—two drams. The temperature was normal on the tenth day. There was no pain in the pelvis at any time. A few streptococci were found in the lochia, but none were discovered in the blood. Many saprophytic organisms were found. Uterine involution was delayed somewhat, but the reaction to the larger doses was satisfactory.

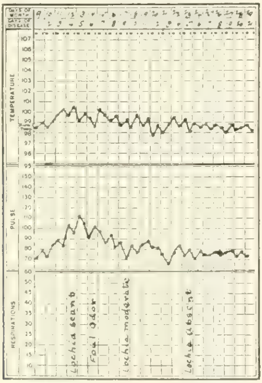

CHART I.—Kate O'R. Sapremia.

The evident cause of this infection was the quantity of blood-clots remaining in the uterine cavity after the hemorrhage.

Exceptionally, the infection may spread by contiguity to the tubes and ovaries in spite of the thickening of the endometrium that closes the minute tubal openings and tends to obstruct the passage of bacteria. Generally, the infection extends to the parametrium by way of the uterine musculature. The cocci gain entrance through any abrasion or laceration of the birth-canal, but the most common atrium is the placental site. This area constitutes the locus resistentiæ minoris of the generative tract. If the infection passes rapidly through the muscular wall, the symptoms of parametritis appear. Damage to the structures is a frequent complication, although the symptoms of parametritis usually overbalance the former condition. As the infection extends along the lymphatics, the walls are thickened and inflamed. The lymph stream is arrested and numerous foci of purulent material appear. If the infection is at all severe, a perilymphatic infiltration of round cells takes place. The muscular wall becomes soft and flaccid and is tender on pressure.

If the destruction of tissue is marked, these multiple abscesses enlarge and at times coalesce and cut out a portion of the the muscular wall in the same manner, as a sequestrium of bone is formed in osteomyelitis. This process is called metritis dessicans. In the early stages of the puerperium the uterus increases in size in spite of large doses of ergot. The fever is high with slight morning remissions. The pulse is rapid, often over 140, but of good quality and not compressible as is usual in sepsis. The uterus becomes tender and its contractions painful. Soon peritoneal irritation is evidenced by constipation and tympany. The general condition is disturbed. The appetite is poor and thirst is tormenting. The lochia becomes purulent and fetid early in the disease. This condition persists until the expulsion of the gangrenous mass of uterine wall which occurs from eight to forty-seven days postpartum. After the expulsion, the general condition improves at once and convalescence is established. The end-results of this process consist of stenosis, uterine atrophy, and sterility. The diagnosis depends upon the discovery in the lochia of muscular fibers and sections of blood vessels in intimate connection with each other. The discovery of isolated muscular fibers is not sufficient.

Regarding the therapy, intrauterine irrigation is to be avoided, as it is not known how thick the myometrium is. The curette is very dangerous. A light tamponade of the uterus to promote drainage, ergot to prevent hemorrhage and to prevent the bacteria from penetrating further into the tissues, and general stimulation of the patient constitute the important points in the treatment.

CASE II. *Metritis Dessicans. Recovery.*—Mrs. L. C. Aged thirty years. Para vii. Previous confinements normal. The seventh labor began on February 4, 1908. The confinement was slow and tedious and a forcep extraction was necessary to save the child's life. The placenta was delivered spontaneously. There were no recent lacerations. For the first two days the temperature was normal, but the pulse began to rise steadily until the eighth day, when it registered 142 beats. On the third day postpartum, the patient complained of feeling sick A slight jaundice was noticeable and she became very restless. The uterus was extremely tender on pressure, but otherwise the abdomen was negative. There was no rigidity or tympany. The bowels were moved with the aid of laxatives. The lochia was profuse and purulent and had an extremely foul odor similar to that emanating from a gangrenous lung.

On the tenth day, after a severe chill, followed by a sudden rise of temperature and pulse, a gangrenous mass was expelled from the uterus. Within three days, the temperature fell to normal and the pulse followed two days later. The general condition improved at once, and from the thirteenth day the convalescence was rapid. The mass consisted of necrotic decidua attached to a layer of uterine musculature. It measured 7 cm. wide, 9 cm. long, and 3 cm. thick. Under the microscope, portions of muscular cells with remains of uterine glands and blood-vessels bound together by connective tissue were easily demonstrated, thereby insuring the diagnosis of metritis dessicans. Unfortunately, the patient left the city soon after her recovery and it was impossible to ascertain whether any permanent changes were produced by the process.

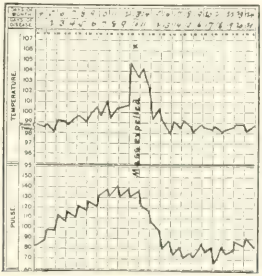

CHART II.—Mrs. L. C. Metritis Dessicans.

Further extension along the lymphatics results in parametritis. The first reaction of the system to infection in this region is a hyperemic and serous infiltration of the tissues. The lymphatics are swollen, yellowish in color, and may be found in various portions of the broad ligaments. The site of election is in the neighborhood of the cervix. A reactionary infiltration of leukocytes into the irritated area takes place immediately in order to destroy or limit the infection. Upon the virulence of the invader and the duration of the fever depends the size of the resultant exudate. From the original foci in the lower portion of the broad ligament, the exudate spreads in the direction of the lymphatics. The course is first in the direction of the tubes and is always extraperitoneal. The exudate then forms behind the uterus and vagina or in the iliac fossa. This extension fixes the uterus in a solid mass and the entire pelvis may be filled. This latter condition is reached only after five or six weeks of fever. In certain cases, the anterior border of the broad ligament is pushed upward and the exudate spreads in the direction of the anterior abdominal wall and may run between the muscle and peritoneum to the level of the navel. In this situation it may be palpated as a thin sheet.

The termination of parametritis varies. If the maternal resistance overcomes the virulence of the infection, the temperature gradually or suddenly falls and the exudate slowly absorbs. Exudates have resolved after having attained the size of a fetal head. Absorption of the exudate is largely dependent upon rest in bed and the avoidance of straining or exertion. Relapses are common if the patient leaves the bed too early. Should the mass becomes infected, the fever returns and presents typical septic characteristics. The abscess may rupture into the bladder. intestine, or through the abdominal wall. Rupture through the intestine occurs about the fourth or fifth week and is determined by a violent diarrhea and the presence of pus in the stools if the abscess ruptured into the rectum. Rupture into the bladder occurs about the same time and is followed by an acute cystitis, the urine being loaded with pus. Rupture through the abdominal wall occurs in about ten or twelve weeks and is heralded by signs of a deep abscess above Poupart's ligament. After rupture of the abscess, the symptoms immediately improve. If any pockets of pus are not drained by the first rupture, the same phenomena are repeated and the process continued until the body is rid of the infection. Because of the proximity of the exudate lying in the iliac fossa to the colon, gangrene is a possibility, and these patients all die.

Parametritis makes its appearance on the third or fourth day by a sudden onset, a sudden rise of temperature and pulse and generally but not always a chill. The pulse rises to 140 or more, but follows the temperature curve rather closely. Peritoneal symptoms occur early The pelvis is tender to pressure and uterine contractions are painful. This tenderness slowly increases over the lower porton of the abdomen. The upper abdomen is free. Vomiting is rare. Sleep is normal after the first few days of fever. The patient feels fairly well and does not present the facies of a serious illness. The milk and lochia are usually decreased in quantity. After the active stage of the disease, the fever declines by lysis with the inversed typhoid type or by crisis as in pneumonia, when the patient may suffer from collapse and require immediate stimulation. The duration of fever varies from two days to many weeks. The average is one week. As the fever declines, the pain and tenderness disappear and the exudate in the parametrium may be felt by bimanual examination. At first it is soft and tender. Later, it is firm and possesses the consistency of a fibroid tumor.

It is impossible to diagnose parametritis from septicemia during the first twenty-four hours. If the symptoms of peritonitis increase and the facies of the patient indicates a serious disease, septicemia is probably present. If the fever, pulse, and pain abate after a few days, the discovery of an exudate points toward parametritis. Later, the examination of the blood settles the question of diagnosis.

There is no prophylactic treatment of parametritis in its strictest sense. The onset of the disease indicates that the infection has already passed beyond the uterus. Any local treatment is without value unless it is to remove large and detached fragments from the uterus. All irritation of the pelvic organs should be avoided. The bowels may be tied up for a few days with opium and then be relieved with laxatives or enemata. An icebag on the hypogastrium allays the fever and relieves pain. The patient should lie quietly in bed until the fever and pain have been absent for at least six or seven days. She may then get up and, if no relapse occurs, she may gradually resume her duties. At the first sign of fever or pain, she should go to bed. A woman who lies quietly in bed for some time after fever and pain have subsided seldom has suppuration. The administration of ergot and hydrastis will serve to prevent the introduction of more bacteria from the uterine cavity.

If suppuration should occur and is accessible through the vagina, the abscess should be opened and drained. In the presence of a continued fever for some weeks, an exudate may be opened from below whether suppuration has taken place or not. The incision and drainage of the pelvic cavity has a beneficial effect upon the process. A puerperal salpingitis, whether unilateral or bilateral, may be thus treated when the fever is of long duration. The abdominal route is not to be preferred in the treatment of acute pelvic suppuration when accessible from below. The danger of rupturing the abscess and soiling the upper peritoneum with septic and virulent cocci is considerable. The better plan is to operate from below, drain and treat expectantly until the fever and other signs of sepsis have entirely disappeared for six or eight months and then repair the damage done by a laparotomy. However, this method cannot apply to women who must earn their own living and cannot afford to wait the necessary length of time. It is a wise plan to refrain from subjecting a septic woman to considerable surgical treatment when the vital organs are in a weakened condition. If the abscess points toward the abdominal wall, it may be opened just above Poupart's ligament.

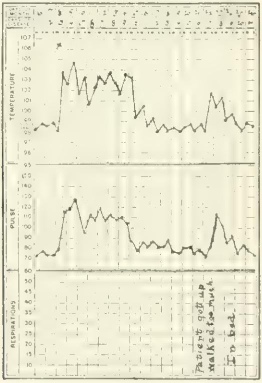

Chart III.—Mary C. Parametritis.

Case III.—*Parametritis. Recovery.* Mary C. Aged twenty-six years. Came to the County Hospital in labor with her first child on June 6, 1908. Previous to her entrance, an attempt to deliver her had been made by a physician, his efforts having continued for one and a half hours. The head lay in the right posterior occipital position. Extraction of a live child was made with the forceps. The patient had small lacerations of the vaginal walls and three stitches were put in the perineum. The mother was placed on ergot and hydrastis. On the third day, a severe chill was followed by pain in the left lower abdomen. The temperature rose to 103.8° F. and the pulse to 116. The patient was placed in Fowler's position, given an ice pack and put on double doses of ergot. For eight days, the fever continued relatively high. The abdominal pain lasted two days, and since that time the patient felt comfortable. The sleep and appetite were undisturbed. On the tenth day the fever fell by crisis, but no signs of collapse followed. On the sixteenth day the patient left her bed and walked around the room for a considerable time and the symptoms returned. She was immediately placed in bed and within three days the conditions were again favorable. Before her discharge an internal examination revealed a mass of exudate in the left parametrium which was slightly tender under pressure. It was equal in size to that of a hen's egg. The uterus was slightly subinvoluted. The later history of the patient was not obtained. Streptococci were demonstrable in the lochia, but were absent in the blood.

Up to this stage of the process the disease is of a purely local nature and the effect upon the body general is not marked. The phagocytes and antitoxins have been able to overcome the invading organisms and by infiltrating areas contiguous to the seat of inflammation or suppuration have prevented a general contamination by the bacteria and their toxins. The disease thus far is not dangerous to life and tends to spontaneous recovery if not interfered with by improper treatment.

In the less favorable cases the natural protection of the body has been impaired by previous ill health or the virulence of the bacteria—notably the streptococcus—is increased. Both conditions may be combined. The result is a general dissemination of toxins throughout the body. The degree of intoxication is dependent more upon the toxins generated by the organisms than upon their number. These general infections are the serious ones. These are the patients who die in large numbers. These are the conditions where we are obliged to stand and watch the patient grow weaker day by day and know to a certainty that death is not far away or in acute sepsis to see her die in the course of a few hours from the time of onset. The treatment of the localized infections is pretty well understood, but in septicemia the therapy is still *sub judice*.

These general infections naturally fall into two classes: 1. where the blood becomes the feeding ground of the cocci—septicemia, and 2. where the blood-stream is the carrier of infected material to more or less distant portions of the body—pyemia.

Septicemia is the more common of the two conditions. Its pathology is both interesting and complex. The uterine cavity is the seat of a severe grade of endometritis, gangrenous endometritis. Necrotic areas may be found covering any and all lacerations from the placental site to the perineum. In acute sepsis, the endometrium may show no changes whatever. In the latter case, the uterine cavity is smooth and presents the appearance seen in normal aseptic cases. The uterine musculature and parametrium show no pathologic changes except microscopically in the detection of chains of streptococci. In the more chronic types the muscular walls are involved in the process. The changes consist of fatty degeneration and edema of the muscular and connective-tissue cells and an infiltration of the interstices with bloody serum. In severe cases gangrene occurs and spontaneous perforation into the peritoneal cavity follows.

As the streptococcus has penetrated the endometrium before Bumm's granulation wall has developed, parametritis is commonly present in septicemia. While the entire broad ligament may be infiltrated with purulent material, the areas usually involved are those along the sides of the uterus and in the neighborhood of the tubes and ovaries. The ligaments are thickened and deeply infiltrated with round cells. The close proximity of the septic material to the peritoneum requires but a short time to produce peritonitis. This is the usual method of infection of the periteneum, though exceptionally, as by the gonococcus, the process may extend by way of the tubes and their fimbriated extremities. The peritoneum may be involved early in the disease and symptoms may be present within twenty-four hours.

Infection of the peritoneum occasions the production of a serous, serofibrinous, or seropurulent exudate varying in quantity from a few ounces to several quarts. In rapidly fatal cases the amount is small, while the peritoneal surface appears deeply inflamed and blistered. In the more chronic types, the exudate is abundant and purulent. This exudate consists of Nature's opsonins fighting against the invading organisms. The future course of the disease depends upon the degree of maternal resistance and the virulence of the cocci. If conditions are favorable, the exudate is shut off from the general abdominal cavity. A pelvic abscess forms which ruptures and drains through the rectum or vagina unless treated surgically. If no attempt is made to localize the process, the patient dies in a few hours or days.

Practically all the organs may be involved in the process when the disease continues for a few weeks. Among the tissues commonly involved are the ovaries, pleuræ, intestines, pericardium, stomach, lungs, heart, meninges, kidneys, spleen, liver, skin, and urinary bladder. The pathological findings consist of cloudy swellings, hemorrhages, and round-cell and purulent infiltrations. Ulceration of the skin, intestines, and bladder are frequently encountered. The gas-forming bacilli, bacillus emphysematous and bacillus aerogenes capsulatus, are not infrequently found in acute sepsis and produce gas in the uterus, liver, and blood-vessels.

Clinically, septicemia appears on the first or second day of the puerperium. The onset is ushered in by a chill followed by a rapid rise of temperature to 105° or 106° F. The temperature falls by lysis, and toward the close is little if any elevated. The pulse follows the initial rise and remains high, above 130. The patient appears very sick from the onset, prostrated by the overwhelming of the system with toxins. One of the earliest signs of grave import is the inability to sleep. Even from the very onset the patient may be unable to catch more than catnaps. This is due to the profound depression of the vital centers. It is natural to expect a putrid lochia from the gangrenous shreds in the uterus as well as the infected ulcers and lacerations in the genital tract. The lochia is often very profuse and has a characteristic gangrenous odor, entirely different from that of sapremia. Upon the virulence of the germs depends the time of onset of peritonitis. Usually, peritoneal symptoms arise in two or three days. General abdominal pain, rigidity of the abdominal muscles, and tympanites are followed by a sudden increase of fever and pulse. The pulse may become exceedingly rapid while the temperature is low. This is of grave import, as it signifies a weakened resistance offered to the invading organisms. A few days later, the pain subsides and the patient feels relieved, but it will be noticed that her strength is markedly reduced, while the facies Hippocratici is plainly apparent. If death is delayed, the peritonitis reaches the stomach and frequent attacks of emesis arise to torment the patient. Later, cough and dyspnea are added to her sufferings. Finally, collapse, preceded by muttering delirium, coma, or twitching of the muscles. The temperature falls, while the pulse soon becomes uncountable. In acute sepsis, death takes place in from twelve to forty-eight hours. In other cases, the patient may live for weeks. In chronic sepsis the woman suffers from chills, profuse perspiration, decubitus, suppurating foc in various parts of the body, and singultus. Vomiting and diarrhea are frequent and drain the patient's strength perceptibly.

Septicemia is diagnosed by the serious depression of the vital powers, the inability to sleep and delirium even at the onset of the process and a rapid thready pulse with or without fever. A diffuse peritonitis slowly or rapidly spreading upward not only assures the diagnosis, but fortells a fatal termination. In nearly all cases, streptococci can be found in the blood by smear examinations or by culture growths in bouillon. Without cocci in the blood we can have no septicemia. It is true that the gravity of the case depends upon the toxins, and their presence in the blood cannot be determined by any known method; nevertheless, if sufficient blood be examined, a certain number of streptococci will be discovered.

It is in the treatment of septicemia that the medical attendant recognizes the limits in the art of obstetrics. The majority of these patients die unless the virulence of the cocci is of low grade. Undoubtedly, many cases or reported cures have been mistaken for parametritis and sapremia or were due to streptococci of low virulence. When the diagnosis of septicemia is correctly made, all prophylactic measures are useless. When the uterus is empty, douching and curetting are positively harmful. If remnants are retained, a finger curettage is permitted to avoid the dangers of sapremia. Only two lines of treatment are possible: 1. to increase the maternal resistance or the opsonins, and 2. to remove the source of infection—the uterus. In acute sepsis which becomes fatal within forty-eight hours, no treatment is efficacious. Theoretically, hysterectomy would be indicated, but the difficulty of making an early diagnosis would deter most of us from recommending this plan of treatment.

In the more chronic forms treatment is directed toward 1. neutralizing the action of the cocci in the blood; 2. increasing the maternal resistance by increasing the leukocytes, and 3. removing the infected focus from the body by surgical procedures.

Efforts have been made to disinfect the tissues chemically by injecting certain substances, as formalin, silver and mercurial salts, into the blood-stream. The author is at present carrying on a series of experiments regarding the intravenous injection of the bichloride of mercury, and has used it in several cases of septicemia with excellent results. These investigations will be published later. One case will suffice here.

CASE IV.—*Septicemia. Recovery.* Carrie T. Aged twenty-nine years. Para- III. Former labors normal. No sepsis. This patient was delivered May 15, 1908, by a midwife. The labor was spontaneous. No recent laceration. She had been examined "frequently" by a midwife during the labor which lasted twelve hours.

Eighteen hours after delivery, the patient complained of severe pain in the abdomen. Examination revealed tenderness on pressure, tympany, and slight rigidity of the recti muscles. The lochia was scanty and without odor. The woman was placed in Fowler's position and given ergot and hydrastis. This treatment increased the lochial discharge, but the general condition was poor. The patient was unable to sleep or eat. The bowels were sluggish and tympany was still present. The abdominal pain had diminished somewhat. On May 18, the temperature had risen to 103° F. and the pulse to 120. The leukocytes numbered 12,000, the erythrocytes 3,800,000. There was no history of distinct chills. On this day a physical examination showed a small parametritic mass in the broad ligament near the internal os uteri. This was painful on pressure. There was a fetid discharge issuing from the cervix and the uterus was soft and boggy. The fundus was palpable six centimeters above the symphysis pubis. A blood culture proved negative. The urine contained a trace of albumin. A diagnosis of parametritis with possible septicemia was made. Thirty cubic centimeters of polyvalent antistreptococcic serum was injected and the dose repeated, but without immediate effect. Saline enemata seemed to have a beneficial influence on the subjective sensations, but the condition of the woman steadily grew worse.

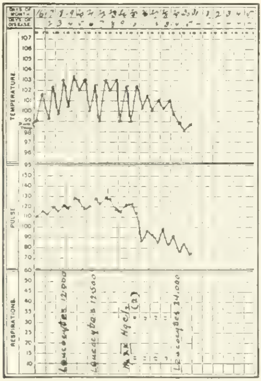

CHART IV.—Carrie T. Septicemia.

On May 24 short chains of streptococci were demonstrated in the blood cultures for the first time, and a positive diagnosis of puerperal septicemia was possible. The patient was evidently getting worse, although the virulence of the cocci was not of the severe grade seen in acute sepsis. Immediately after the discovery of the streptococci in the blood, 20 minims of a 1 per cent. solution of bichloride of mercury was injected into the basilic vein with a platinum needle. There was no local reaction. This was due to the fact that the tourniquet was removed from the arm after the needle point was inside the vein and the current of blood carried the mercury away immediately. This dose was repeated twice on the following day and once on the three succeeding days. The immediate effect was beneficial and the pulse dropped to normal on the thirtieth, or seven days after the first injection. With the improvement in the pulse and temperature, the general condition became satisfactory. The appetite and sleep returned and recovery took place in due time. The leukocytes were increased from 12,000 on May 21 to 24,000 on May 29. On June 4, no streptococci were found in the blood although a prolonged search was made for them.

Generally speaking, these agents are ineffective. Collargol is no specific, but may be used in certain cases. It may lower the temperature, reduce the number of chills, improve the general condition, increase the appetite, and promote sleep. The pulse is often reduced in frequency and strengthened in force. This favorable action of collargol is the exception rather than the rule. On the other hand, its administration may be followed by a rapid rise in temperature, marked increase in the pulse rate, and pronounced chills. In acute sepsis, septicemia, and peritonitis it is useless. According to Hocheisen, collargol is indicated in pyemia, septic pneumonia, and endocarditis. In local infections that tend to become general, collargol may produce desirable results if given early. From 3 to 5 cm. of a 2 per cent. solution is injected intravenously from two to three times daily and the treatment is continued for a number of days if the action is favorable.

The use of normal salt is productive of certain results. It acts by diluting the toxins in the blood and stimulating elimination. The water relieves the thirst that is so tormenting to the patient. The heart is stimulated and the blood-pressure raised. The dilution of the toxins and their partial elimination stimulates leukocytosis to a certain degree and thus increases the bodily resistance. This artificial serum is very valuable in the treatment, but it cannot cure the disease.

The history of serum therapy has been a disappointing one. Its enthusiastic claims have not materialized. The different strains of streptococci and the instability of their virulence have made it extremely difficult to prepare a curative serum. If the infective agent is purely streptococcic, the serum will be beneficial if administered early. If the infection is mixed, the serum is of little value. Bumm claimed one cure in three cases of pure septicemia. The inutility of serum therapy after the secondary effects have become pronounced is at once apparent. Theoretically, serum therapy is the ideal treatment, but in its present state of development, little encouragement is to be expected. Inasmuch as its administration is comparatively harmless, serum may be used in all cases of septicemia without danger.

Attempts have been made to produce an artificial leukocytosis by the daily injection of 50 cm. of a 2 per cent. solution of nucleic acid. V. Herff claims that it is impossible to do this in a virulent sepsis, as the toxins hinder the increase of leokocytes.

The French have used turpentine by rectal enemata and also by subcutaneous injection—Fochier's absces de fixation. No benefit has been obtained therefrom.

Generally speaking, we can state that we are not able to increase the maternal resistance in the face of a virulent sepsis.

The last method of treating septicemia—hysterectomy—is open to the objection that, in order to be of value, the operation should be performed early when the infection is limited to the uterus. In the great majority of cases, the diagnosis is made too late for hysterectomy to be of any value. When performed too late, the shock of the operation added to the sudden entrance into the circulation of enormous amounts of toxins through the fresh surfaces only hastens the fatal end.

Finally, we may state that our treatment is to be limited to the prevention of sapremia by removing any portions of the placenta, decidua, or blood-clots present; ergot, to promote firm uterine contractions; salines, to dilute the toxins and stimulate excretion; water, both internally and as baths; serum; alcohol in moderate amounts; cardiac stimulation, notably strychnine and digalen, and as much nutritious feeding as the patient can assimilate.

CASE V.—*Eclampsia, Septicemia. Death.* Anna T. Aged twenty-eight years. Para-I. This patient had been under the care of several physicians during a very difficult delivery. Several attempts in extracting had been negative. The woman was finally sent into the hospital undelivered and in eclampsia. One convulsion occurred as she was being prepared for delivery. There was marked edema of the vulva and external portion of the perineum. The pelvis was generally contracted. A difficult extraction was effected by embryotomy. No convulsions occurred after delivery.

Postdelivery examination of the urine—obtained by catheterization—showed the usual findings of nephritis. The quantity of urine increased and the patient seemed to be improving from the eclampsia only to die from the septicemia. The vaginal lacerations soon became gangrenous and the lochia fetid.

On the sixth day postpartum, a chill occurred and the temperature began to climb until it reached 106.5° F., and the pulse became very weak and rapid. Streptococci were found in the blood. The combination of eclampsia and septicemia proved too much for the patient. The condition of the soft parts at the time of delivery and the complications presenting contributed largely to the fatal termination.

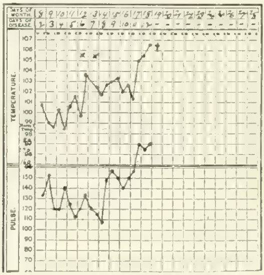

CHART V.—Anna T. Septicemia, Eclampsia.

The surgical treatment of general peritonitis occurring in septicemia offers the only hope of recovery. In order to be effective, it must be resorted to early. The transverse colon with its attached mesentery serves to localize or limit the infection to the lower half of the abdomen and the operation should be done before this barrier is broken down. In puerperal peritonitis that shows no tendency to become localized in the pelvis, but spreads upward toward the diaphragm, operation is indicated as soon as the diagnosis is made. Two conditions should be present; the general condition of the patient must be good. She must be able to stand the shock of the operation and not be too prostrated by the infection. Second, the entire peritoneum should not be involved. If these conditions are not present, the outlook is very unfavorable. The difficulty is to make an early diagnosis. If opiates are used at the onset, the symptoms may be so masked that a diagnosis is not possible until the classic picture of peritonitis is present in all its details. At this time operation is useless.

It may be difficult to differentiate between symptoms of pertoneal irritation complicating parametritis and actual peritonitis occurring in septicemia. Distention of the abdomen, meteorism, tenderness on pressure, and a high pulse are signs common in both conditions. If one could wait and observe the clinical course of the disease, a later diagnosis would not be difficult.

A most excellent method of making an early diagnosis is effected by the use of the Pravaz syringe, as recommended by Bumm. This is a fine aspirating needle that is thrust through the abdominal wall whereby some of the exudate is secured for bacteriological examination. The patient is laid on her side in order to allow the fluid to gravitate to the lumbar region and the syringe is introduced at that point. If fluctuation is present in the culdesac, the needle is passed through the vaginal wall. There is little danger of injuring the intestines by this procedure. We may substitute for the Pravaz needle a small trocar and canula with which to perforate the wall and insert a small urinary catheter to remove a portion of the exudate. If the peritoneal exudate contains streptococci, an immediate operation is necessary. The uterus is to be removed during the operation if a history of perforation is present, if it is the seat of multiple abscesses, metritis dessicans, or gangrenous endometritis. This formidable procedure greatly increases the mortality.

In the operation for puerperal peritonitis, an incision is made parallel to and above Poupart's ligament on the left side. A counter incision is then made over the lowest portion of the peritoneal cavity in the left lumbar region. After the accessible exudate is removed, a gauze drain covered with rubber tissue is passed in and drains both incisions. The same procedure is repeated on the opposite side. A third drain is then passed from the right inguinal incision through Douglas' pouch and into the vagina. The entire abdomen is covered with thick layers of dry dressings and these are changed twice daily. The operation need not last over ten minutes. Small doses of eserine are given to relieve flatus. Submammary injections of normal salt are given for the first two or three days. The patient is placed in Fowler's position immediately after operation. The gauze drains are left *in situ* for from ten to sixteen days.

CASE VI.—*Acute general puerperal peritonitis. Death.* Lizzie P. Aged thirty-four years. This patient gave a vague history of having a criminal abortion performed upon her by a midwife when two and a half months pregnant. The operation was performed during the first week in May, 1907. One week later she became sick and was taken to a local hospital where she was kept under observation for nearly three weeks. As her condition was growing worse, she was admitted to my service at the County Hospital on June 1, 1907. The patient was emaciated and gave the impression of being seriously sick. The facies Hippocratici was present. The face was extremely pale while the lips were scarlet red. The temperature registered 101.8° F. and the pulse 126, weak and of low tension. The abdomen was distended and fluctuating, but was not tender at any point. The leukocytes numbered 26,000 and the hemaglobin 65 per cent. The subjective and objective conditions were directly opposite to each other. The patient was immediately placed upon the operating table and the abdomen opened. About four and a half quarts of purulent exudate was removed. This contained streptococci and staphylococci. The general peritoneal cavity was infected and we could find no attempt made to localize the infection. No irrigation was used. Counter incisions were made and iodoform gauze carried through with forceps. The operation lasted twenty minutes.

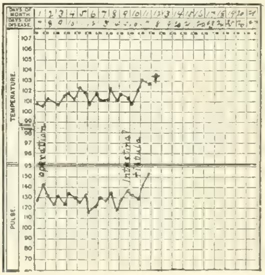

CHART VI.—Lizzie P. Acute General Peritonitis.

The drainage for the first forty-eight hours was profuse. The almost inevitable infection with saprophytes in such a case soon caused a foul odor to the discharges. Vomiting occurred only twice after operation. It had been absent previously. The patient complained of no pain or discomfort except the inability to sleep. On the eighth day, feces were passed through the opening in the abdominal wall and this continued till her death two days later.

Peritonitis had undoubtedly existed for some time prior to her admission to the hospital although the symptoms were somewhat masked. The incision and drainage were done too late and the general infection had undermined the patient's strength so that death was inevitable.

While pyemia may originate in pregnancy, it occurs usually in the early days of the puerperium or during labor itself. Strictly speaking, pyemia is due to the presence of masses of infective material floating in the blood, having been detached from the original focus of infection and carried to distant portions of the body where, according to their virulence, they produce infarcts or metastatic abscesses. As the extension occurs more commonly by way of the veins, pyemia is generally seen after operations in the third stage of labor that have to do with manipulations of the placental site. Placenta prævia and manual removal of the placenta or retained decidual fragments are common predisposing factors. More rarely lacerations of the birth-canal, carcinoma, and hemorrhoids occur.

Any of the pyogenic organisms can cause pyemia. The bacteria enter the placental site during the puerperium when the uterine sinuses are filled with aseptic thrombi which are poorly prepared to resist pyogenic invasion. The extension of the infection to the proximal extremity of the thrombus is rapid. In the parametrium, the invasion is along the venous walls—phlebitis. This phlebitis may or may not be associated with thrombosis. As the bacteria escape from the veins, an infiltration of round cells is formed to resist their advance and when this condition is pronounced, the veins feel like thick bands under the palpating finger. If thrombosis is present, the venous enlargement is due to the contained thrombus. If the infection is severe, a rapid extension takes place along the uterine plexus, spermatic, hypogastric, and iliac veins. In rare cases, the inferior vena cava is involved. Exceptionally, extension occurs by the way of the lymphatics, producing abscesses in the lymphatic glands, attacking the thoracic duct and finally emptying into the veins.

Whatever method is taken to reach the venous circulation, the result is the same. The thrombosis, when present, is always secondary to the phlebitis or the multiple abscesses in the venal wall. The detachment of septic fragments and their conveyance to distant portions of the body forms the clinical picture of pyemia. As the emboli become lodged in the capillaries, the end result depends upon the virulence of the contained germs. If their virulence is low, infarcts result. Most frequently, infarcts occur in the lungs, where their presence may be detected by pleurisy, pneumonia, or hemoptysis which may result fatally. Second in frequency are the kidneys, where the infarcts may be diagnosticated by hematuria and pain in the region of the organs. Infarcts in the spleen are found postmortem, but they give rise to no symptoms during life. Infarction of the placental site may take place from two or three weeks postpartum and cause the severest type of late postpartum hemorrhage. Generally suppuration occurs.

The joints are favored points of attack, and the elbow and knee appear to be specially predisposed. Subcutaneous abscesses are common. The parotid gland, eye, meninges, and brain may become involved. Ulcerative endocarditis is an unfavorable complication. It is only a symptom of the general condition. It acts deleteriously by crippling the integrity and power of the heart, and by promoting capillary thrombosis in various portions of the body.

In late cases or where the virulence is low, only those veins are affected that were formerly thrombosed. The infection and suppuration take place in the center of the thrombus and spreads in the direction of the heart. After a definite period of time, the process arrives at the proximal extremity and the first fragment is detached and thrown into the blood-current. This is announced by a chill. Several days to a week may elapse before the second fragment is broken off, and in the interim the body has an opportunity to react to a certain extent. In this case the disease may last for months and a single infected vein may constitute the only pathologic structure in the body as the area between the thrombus and the placental site; in fact, the uterus itself has become sterile. Chills constitute the only symptom of the disease, abscesses are the exception.

Pyemia makes its appearance somewhat later than septicemia. The temperature between delivery and the first chill, which occurs within five or eight days, is slightly elevated. There are no signs of peritonitis, parametritis, or other local disease. Except for the palpation of the thrombosed or thickened veins in the broad ligaments, the abdominal and pelvic findings are negative. The interval between chills may vary from one day to several weeks. The disease may last from ten to fourteen days; in the acute, fatal cases, to many months. In the chronic form, the primary chill may occur as late as the eighth week postpartum. Recovery is the rule in these late cases.

The mortality of puerperal pyemia is high. V. Winckel's statistics give 95 per cent.; Bumm reports 83 per cent.; Lenhartz, 65 per cent. Seegert, from Ohlhausen's clinic reported 39 per cent. mortality in seventy cases after delivery. Opitz found a mortality of 55 per cent. in a collection of 339 cases. Many of these fatal cases died from extension of the thrombosis into the inferior vena cava, advanced valvular heart lesions, ulcerative endocarditis, and septic or gangrenous pneumonia. The outlook is very grave where operative procedures are carried out within two weeks after delivery. Only three such cases were saved in twelve. By a late operation, the results are better, eleven women being saved in a series of twenty-five.

Extension of the infection along the lymphatics contraindicates operative interference. If possible, operation should be deferred until the condition has become subacute and the pathology is limited to a smaller number of veins. Thrombosis of the vena cava and pulmonary abscess give a fatal prognosis. v. Herff states that it is better to wait until at least six chills have occurred, and correctly holds that each rigor may be the last and mark the beginning of convalescence. In serious cases that seem hopeless, where the chills are frequent, the pulse rapid and of poor quality, and, according to Macan, where there is an absence of eosin-colored cells and a serious diminution of hemoglobin in the blood, operation should be no longer postponed.

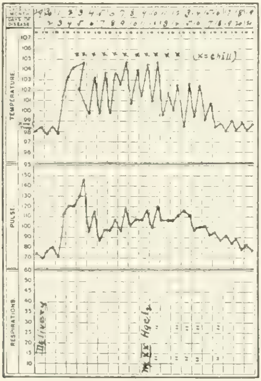

CHART VII.—Lena W. Pyemia.

CASE VII.—*Parametritis, thrombophlebitis, pyemia. Recovery.* Lena W. Aged seventeen years. Single. Last menstruation September 2, 1907. Labor occurred June 29, 1908. Spontaneous delivery. No lacerations. Two internal examinations. Placenta and membranes complete. The puerperium was normal for thirty-eight hours, at which time the patient had a severe chill accompanied by pain in the lower abdomen. A second chill occurred some ten hours later and the temperature reached 104.4° F. At this time she was transferred to my service at the County Hospital. The patient complained of severe pain over the lower abdomen, but otherwise was in fairly good condition. Sleep was undisturbed and the pulse was of fair quality. The pain gradually subsided until July 6, when the following examination was recorded: Abdomen tympanitic. Marked rigidity and tenderness in right lower quadrant. No disturbance in left side. Uterus extends midway to umbilicus and is very tender. Vaginally, os uteri admits one finger. Cervix lacerated on both sides. Enlarged veins palpable in the left parametrium extending to the side of the pelvis. On the right side was felt a parametritic exudate equal to a hen's egg in size. Breasts are negative. Leukocyte count 14,600. The urine showed a trace of albumin. A blood culture proved the presence of streptococci in short chains.

From this time to July 13, a distinct rigor occurred every day and was accompanied with a sudden rise in temperature and pulse. The sleep began to fail and the patient complained of growing very weak. Perspiration became profuse and exhausting.

The treatment up to July 9 consisted of stimulation, ergot and hydrastis by mouth, and external douches of lysol solution. The condition of the patient up to this time was unsatisfactory. On July 9, I injected 20 minims of a 1 per cent. solution of mercuric bichloride intravenously, using the bend of the elbow for the seat of puncture. This injection was repeated on the tenth, twelfth, thirteenth, fourteenth and sixteenth, days of the month. Associated with these injections was an improvement in the general condition, appetite, and sleep. No local reaction followed the treatment at any time. After the 13th, no chills occurred and the patient rapidly recovered.

On July 29, an examination showed the mass on the right side barely palpable. The left broad ligament was somewhat tender, but no enlargement of the veins could be discovered. The uterus was well contracted. The cervix, vagina, bladder, and perineum were in good condition. The patient was discharged soon after and ultimately recovered her health completely.

Sippel, in 1894, advised ligation of the veins without hysterectomy. Freund, in 1897, operated in two cases, but both patients died. Trendelenburg attempted to reach the veins by an extraperitoneal route. He operated on four cases, but all died. Later, Bumm ligated the spermatic and hypogastric veins in five cases and saved three mothers. Lenhartz saved only one mother in eight by ligating the spermatic veins and in some cases the hypogastric and iliac veins.

While the mortality in puerperal pyemia is high and every method of treatment that offers any prospect of cure should be tried, it is well to select the cases suitable for operation as far as possible. The operation is difficult technically and requires an experienced abdominal surgeon and, therefore, is impracticable for the general practitioner. In good hands the immediate danger is small, as shown by v. Herff's collection of thirty-seven cases where only one death was traced to the immediate effect of the operation.

In the cases complicated by cardiac lesions or poor resistance offered to the infection, the medicial attendant realizes that the condition is one that has passed beyond the limits of the art of obstetrics.

CASE VIII.—*Puerperal septicemia and pyemia, septic pneumonia. Death.* Hannah G. Native of Russia. Aged thirty-two years. This patient entered the County Hospital, June 1, 1907. One month previously, she aborted an ovum of two months' development. Her condition was fair for one week, when she became sick. Several local physicians were called in and many vaginal examinations and one curettement made, and she was sent to the hospital.

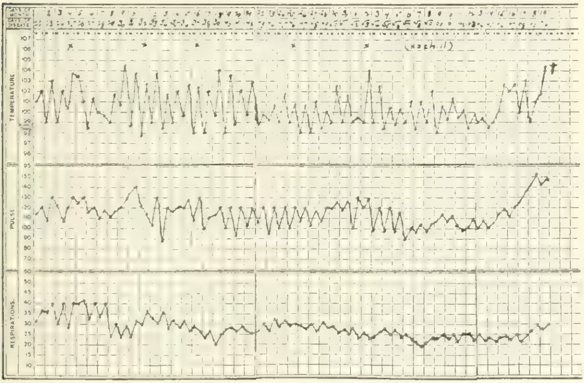

CHART VIII.—Hannah G. Puerperal Septicemia.

Examination showed an anemic patient lying in a muttering delirium. Lips and tongue dry and covered with sordes. Eye normal to light and accommodation. Slight cervical adenitis. Pulse weak and rapid. Finger-nails and toe nails cyanosed. Heart tones strong. Systolic murmur heard slightly to left of sternum and at level of third costal cartilage and referred down the sternum. Respirations increased in frequency but regular. Small crackling râles heard at bases of both lungs. Abdomen relaxed and slightly tympanitic. Spleen palpable and extending to one inch below costal margin on right side. Vaginal examination shows slight bloody discharge. Cervix inflamed, bilateral laceration. No special point of tenderness or swelling. Uterus small and not tender.

The diagnosis in this case lay between typhoid fever, bronchopneumonia and septicemia. In the Widal test, clumping began in twenty minutes, but motion was still active after forty-five minutes. The dilution used was 1 to 40. Blood culture showed the streptococcus as the invading organism. Urine was negative.

The condition of the woman suggested the possibility of septicemia and septic pneumonia, although no streptococci were found in the blood.

The pneumonic process gradually subsided and gave the patient some relief from the difficulty of respiration. The pulse and temperature continued high and perspiration was profuse. A decubitus soon developed over the sacral region and prevented the patient's lying on the back. This was dressed with oxide of zinc ointment, but it never healed. On June 9, the knees became very painful and the left wrist and left ankle were swollen and tender.

On the 11th the leukocytes numbered 13,400 and the red blood-cells 2,600 000. The woman was markedly anemic. The tongue was clean. A few glands were palpable in the neck. Many crepitant râles were heard in the bases of the lungs. The spleen has diminished in size perceptibly. No parametritis.

On June 24 the record reads: Half stuporous, eyes half open, and body bathed in profuse perspiration. The following day, an abscess at the left sternoclavicular articulation was opened and three ounces of pus found. The next day, six ounces more were taken from an abscess in the back, under the left shoulder.

June 29, an incision, one and a half inches long, was made internal to the tendon of the rectus of the left leg and six ounces of pus removed. This abscess cavity communicated with the knee-joint. On July 1 an abscess developed over the carpal bone of the thumb of the left hand and was opened the same day. Another abscess developed in the left ankle-joint on July 3, and this was opened two days later.

During this time no enlarged veins were palpable in the pelvis to account for the pyemic process. Undoubtedly they were there. The condition of the patient precluded any operation at this late stage of the process.

From this time to her death on July 10 the patient became weaker and weaker. She refused to eat and the rectum was so irritated that enemata were immediately expelled. The vital powers were gradually worn out and the exitus was preceded by a rise in both temperature and pulse.

4433 LAKE AVENUE.

GYNECOLOGY IN THE YOUNG.

BY

JOHN VAN DORAN YOUNG, M. D.,
New York City.

In the consideration of this subject I limit my paper to the study of gynecological conditions in young women after the beginning of menstruation, and prior to marriage. I am aware that this is rather an indefinite period of time, but it is a time in the development and growth of the woman during which gynecological conditions often arise and are concealed both by the patient and her mother, unless it happens that the mother is unusually broadminded in her opinions and capable of considering the ultimate result of neglect on the health and life of the developing woman. I do not consider the gynecological conditions of the very young, or specific conditions, gonorrheal or syphilitic, that may arise by accident or through sexual relations; neither do I consider conditions of the external genitalia. The broad subject of sexual hygiene upon which so much has been written, must also be passed over, and I limit myself to a consideration of the symptoms of intrapelvic gynecological conditions of sufficient gravity to call for treatment or operation.

I am well aware that the gynecologist has often been criticised for examining the young unmarried patient; but I am also convinced by a long experience in this field that the examination of young women is never done except in the cases in which, in the opinion of the examiner, the symptoms fully warrant the examination, and that no class of workers realize their responsibility as keenly as do the gynecologists.

The position of the gynecologist is peculiar in this class of cases in that, suspecting pelvic conditions, he must be sure that the symptoms warrant the examination, or else subject himself to the blame attached to an unnecessary exposure of the patient which, in the eyes of the laity, is little short of a crime. At the same time there can be no question as to the wisdom of avoiding, if possible, a gynecological examination when this can be done without detriment to the health or life of the patient. What are the symptoms that warrant this procedure? Unfortunately, gynecological symptoms are proverbially vague and uncertain in the early years of life.

Local Symptoms.—Leukorrhea is due to hypersecretion from the cervical and endometrial glands, the character of this discharge being ordinarily a simpler oversecretion from the hypertrophied glandular structure. The amount of discharge varies greatly and does not seem to bear any relation to the severity or importance of the pelvic lesions, but to the amount of glandular hypertrophy and to congestion. The character of the discharge varies from the normal viscid clear mucus to the malodorous green discharge of the chlorotic, neurasthenic young woman. This symptom, although particularly annoying to the patient and one most frequently complained of, must be regarded as a symptom only. In this group of cases the symptom of leukorrhea may be regarded as to its character, duration, and severity in determining the importance of operative procedures; but I do not believe that it is possible to form any judgment as to the importance of the lesion from the character, duration, or amount of the discharge.

Menstrual Disturbance.—Irregularity of the flow, as to length of time between the periods and amount, is important. When the interval is shortened to fourteen days or less, it can be safely deduced that there is some grave cause for pelvic congestion.

When the interval is lengthened beyond the ordinary twenty-eight days and there is no systemic cause of the amenorrhea, an undeveloped uterus or sclerotic ovaries may be suspected. An excessive flow is due to uterine or pelvic congestion and is secondary in nature. When the amount is lessened, it is due to pelvic anemia or to uterine anemia caused by a faulty development or a faulty performance of the ovulatory cycle due to ovarian sclerosis.

Pain.—The subject of pain, gynecologically considered, is one that mystifies the observer, and when the symptom is cloaked by the veil of neurasthenia, it puzzles the most careful investigator.

For convenience of classification the subject pain may be divided into pelvic pain and reflex pain. The pelvic pain may be subdivided into aching, dragging, or bearing-down pain, and colic.

The aching is in general a symptom of pelvic congestion due to any cause whatsoever. It may be associated with the period, but usually precedes it, and, after the flow is well established, is relieved. It is as a rule, constant in character, lasting several days, increased on exertion and associated with irritability of the bladder, constipation, headache, and neurasthenia.

The dragging or bearing-down pain is constant in character, although varying in severity, and is due either to misplacement or growths.

Colic immediately precedes or is associated with the flow, and has its origin either in faulty development of the uterus or in sclerosis of the tunica albuginea. This symptom varies from a slight crampy pain to a most severe colic, unrelieved by any drug except morphine. It is usually referred to the lower portion of the hypogastric region, but where due to ovarian sclerosis, may be referred to the ovarian region on one or both sides. Uterine pain may be due either to stenosis, when the passage of a small clot will follow the pain, or it may be due to the flexion atrophy resulting from anterior or posterior bendings of the uterine body. When the flow is normal in character and the pain laterally situated, a sclerotic ovary should be suspected.

Irritable Bladder.—The cause for irritability of the bladder of gynecological origin and not associated with lesions of the bladder are pressure due to an anteflexed or anteverted fundus; also any retroposition of the uterus with or without prolapse, causing the organs to drag on the bladder wall and interfere with its functions. The cause of this symptom must of necessity be mechanical in origin.

Constipation.—Where this condition is not systemic or due to habitual neglect, it is either caused by relaxation of the muscles of the perineum with a tight sphincter ani or else is due to the mechanical obstruction of the bowel by retroversion alone or with flexions or to tumors.

In all these conditions pelvic pain may be associated with pain due to appendiceal colic, catarrhal appendicitis, and the milder forms of chronic appendicitis with concretions, constrictions, and adhesions.

In my experience lesions of the appendix are so often found with these conditions in young women that it has become my habit to associate a chronic appendicitis with all these cases. The differentiation of pain and tenderness due to microcystic or sclerotic right ovary and a chronic appendicitis is often difficult for the reason that the pain may be very similar in character, come in attacks, and closely resemble ovarian colic. I also believe that where the appendicial condition is suspected, it is an additional reason for surgical interference.

Backache.—This symptom is of two types, lumbar and sacral. The backache in the lumbar region is usually not associated with the period, and is due to the dragging of a retroverted or prolapsed uterus. The sacral pain is, as a rule, associated with the period, and is caused by uterine or pelvic congestion.

Headache.—The association of headache with gynecological conditions is hard to explain except under the general term of reflex. The location of the headache is usually occipital, occurring just prior to or after the period, sometimes showing itself in the form of severe migraine. Before any decision is reached in relation to the cause of the headache, the ocular condition should be looked into. Gynecological headache is not always concurrent with the period, the attacks of migraine occurring at any time during the intermenstrual period. When the intermenstrual attacks persist, a gynecological cause is to be suspected after the ocular condition has been eliminated.

Neurasthenia.—Under the general term of neurasthenia are grouped so many symptoms of so indefinite a character, that it is unwise to pronounce neurasthenia a symptom of any condition. It is rather, perhaps, a nervous condition caused by the pelvic lesions. Some of these patients are always neurasthenic with the condition aggravated at the time of the period; others, between the periods, are normal individuals. It is much more difficult to account for the continued neurasthenia than for the intermittent type. The symptoms may be classed under the term of psychoneurasthenia, although all varieties are common. The one that I have observed most frequently has been melancholic in character. In some cases the melancholia has been very marked, coming on in attacks so severe as to raise the question of a true melancholia that would necessitate confinement in a sanitarium. In other cases the neurasthenia has shown itself in apathy and lack of interest during the attacks, the patient remained uninterested in anything, and performed only those functions necessary to the preservation of life. On the other hand, we frequently see cases of the irritable, cross, fretful, dissatisfied, and unhappy, an individual to whom nothing is right, with outbursts of severe and at times uncontrollable temper. It has been my experience that the neurasthenic symptoms are most frequently associated with microcystic or sclerotic ovary, prolapse of ovary, retroversions and retroflexions, or both combined with prolapse.

General Conditions.—The general conditions associated with gynecological conditions are anemia and gastrointestinal toxemia. Most frequently these conditions are associated with poor general health, although there are many cases in which the gynecological condition does not seem to affect the general health to any perceptible degree, and this is often misleading.

Examination.—For a patient presenting any of the foregoing symptoms that do not yield to medical treatment and hygiene for a rational length of time, it is my opinion that an examination is warranted. The large percentage of cases presenting symptoms which yield to the proper medical and hygienic treatment it is obviously unnecessary to examine. There are also a percentage of cases which persist in symptoms because proper medical and hygienic treatment cannot be carried out. I believe that it is not fair to charge these cases to gynecology until proper arrangements can be made for their preliminary treatment. It is also best to remember that the general medical treatment and hygiene will do much toward preparing the patient for her necessary operation.

Method of Examination.—It is of little or no value to the patient, and of very small advantage to the surgeon, to make an incomplete examination except when it is made because the patient is desirous of escaping a more severe ordeal, and is willing, on learning the result, to have an examination under ether. It is always unwise to examine a patient except on a properly arranged gynecological table; examinations either in bed or on a couch are always unsatisfactory, and in these cases the examiner needs the advantage of every possible aid; the buttocks sinking in the bed will often so distort the relations of the pelvic organs that important lesions may be missed. It is my custom to examine these patients at the office and under strict surgical conditions. It is always wise to explain to the mother or to the patient herself, prior to the examination, the fact that if a vaginal examination is made, the hymen may be ruptured. It is possible in many cases to examine a patient with a gloved hand, well lubricated, and not lacerate the hymen.

Rectal examinations are sometimes satisfactory, but require much practice in order that the examiner may be able to recognize the pelvic conditions. I have often found it difficult to determine the position of the uterus in a rectal examination, but have found that a sound introduced into the vagina gives useful knowledge as to the relative position of the cervix.

To eliminate the resistance of a patient to an examination is the hardest thing to accomplish. Under these circumstances or when the findings of a former examination are not satisfactory, the patient failing to improve under medical and hygienic care, it is my custom to advise an operation, at least an examination under ether, with the permission to do what constitutes the necessary measures—that is, permission to perform anything from a simple examination to a laparotomy.

After examining the patient, what are the conditions that should warrant further procedure? In the first place, I think that in the young unmarried woman, local treatment requiring manipulation of any sort is to be avoided if possible. The use of douches and tamponade may be required for a short space of time to overcome as far as possible pelvic congestion, but I am distinctly in favor of surgery if surgery can relieve the condition. This statement applies particularly to those in whom the organs of generation have never been called into action, but I eliminate all cases where congestion supervenes development of the sexual function. The line dividing these two classes of cases is very clearly marked and well known to every gynecologist.

Local Treatment.—After every form of hygienic and general medical treatment has been tried, the question of gynecological care comes up. As stated in this class of cases, I am averse to local treatment, but there are a certain number of cases of erosion of the cervix and general pelvic congestion when proper local treatment is not only advisable, but beneficial; also the postural treatment of anteversion and retroversion. There are a few cases in which a properly fitted pessary may be used for retroversion. I do not advise it ordinarily, but in selected cases it has a distinct advantage.

The use of a stem pessary for stenosis and the milder degrees of flexion is also well worth consideration.

Surgical Treatment.—Rapid dilation with curettage is a procedure of great value in the relief of stenosis. It should be done with strict surgical technic, and followed either by packing or the introduction of a stem pessary; careful postoperative treatment being carried out in the form of uterine dilators once or twice a month, or the replacement of the stem pessary. Severe degrees of stenosis should not be expected to yield to one rapid dilatation, as it is certainly the natural tendency of the structure to recontract.

Dilation with curettage is indicated where there is adenomatous hyperplasia of the endometrium. It is one of the most important and most abused operations in the field of gynecology. There certainly is no advantage in curetting a normal endometrium and no assurance of the cure of a diseased condition unless the entire diseased area is removed. This can be done only by special curettes made to reach the various areas of the uterine wall. The angle formed by the junction of the roof and the lateral wall is the part most frequently neglected. I know of but one instrument that reaches this area satisfactorily, and that is the Tucker curette—an instrument that should be most carefully used. The douche curette has given me most satisfactory results. The solution that I use is iodine.

The dilatation of the cervical canal prior to curettage is of very great importance, and the use of powerful instruments often necessary, but most dangerous unless governed by judgment and experience.

The danger of rupture of the uterine neck and the perforation of the uterine wall with a curette render this apparently simple operation a most formidable procedure at unexpected times.

The Dudley operation is done for the relief of anteflexion and stenosis.

The question of vaginal section in this class of cases need only be mentioned, as in most of these cases this method is contraindicated on account of the necessity for stretching the undeveloped structures of the vagina and pelvic muscles.

Alexander's operation has its strong advocates, and in many opinions fills a useful position in this field of surgery.

The incision for a laparotomy should be median, either semilunar, below the hair-line, or the usual vertical median incision; in either case it need not be large, as there seldom are adhesions to trouble the operator. As the first step in the operation, the appendix should be located, anchored by a temporary stitch to which is attached an artery clamp. This is done so that unnecessary handling of the intestines may be avoided; in fact, one of the essential points in all intraabdominal work of this type is to avoid manipulation of the peritoneum. The walling off of the general abdominal cavity by the use of sponges soaked in saline solution is of great advantage, clearing the field and protecting the peritoneum.

The inspection of the uterus, tubes, and ovaries is the next step. The tubes are usually found normal. If tubercular salpingitis is found, it must be removed. The conditions of the ovary most frequently found vary from microcystic ovary to ovarian cysts of various sizes. The treatment for ovarian cysts is removal. In the smaller varieties or when the condition known as microcystic ovary exists, the question of saving a portion of the ovary naturally comes up, and should be carefully considered; the operator having explained to the patient or her guardian the possibility of degeneration of the tissues left. In my experience plastic work on the ovary does not always arrest the process of degeneration. There is no possible question as to the advisability of the protection of the reproductive function in these young patients; and the responsibility of the operator is grave as to the decision of saving or sacrificing an ovary. It is also important in cases of ovarian prolapse to prevent the return of congestion by shortening the uteroovarian ligament or by the Barrow's operation.

If sclerosis of the tunica albuginea has progressed beyond the hope of saving the ovary it should be removed. A portion of the sclerotic tunic may at times be removed, thus relieving the pressure on the remaining ovarian structure.

The best operation for retroversion is sacral suspension.

Gilliam's is indicated for retroflexion.

For retroversion with flexion and prolapse, sacral suspension with Gilliam.

Fibroids and various other conditions of the uterus and adnexa may require surgical interference.

Appendectomy should be the last step of these operations.

Case I.—M. B. Aged seventeen. General health poor, anemia, constipation. Menstrual history as follows: began at twelve and one-half years, amount scanty to profuse clots, period fourteen to forty-two days, duration three to four days. Pain: dragging, bearing-down, aching. Severe cramps with the period. Backache, lumbar. Profuse leukorrhea. Examination: diagnosis, retroversion with chronic appendicitis. Operation, October, 1907. Curettage, removal of the adenomatous growths. Laparotomy, removal of a portion of the right and left ovaries for microcystic degeneration, sacral suspension. Removal of appendix for chronic catarrhal appendicitis with spiderweb adhesions and kinking. Patient made an uneventful recovery and showed a very marked improvement for about two months, when her father died suddenly, and the shock to her general nervous system was very great. Recovery from this condition was rather slow, but has been complete. Examination made one year later showed anatomical position of the uterus normal, otherwise pelvic examination negative. The patient's general condition was excellent and she has since remained in good health.

Case II.—E. N. Aged twenty-five. Patient in very poor general health most of the time. Menstrual history was practically negative except the variations that might occur within the limits of fair health. She has been subject for many years to the most violent headaches, at times migraine in character; these headaches coming on, as a rule, with the period. She has had several attacks of melancholia so severe that for two weeks at a time she would lie in bed with no interest in anything, crying most of the time, and no amount of coaxing would elicit a word of response of any sort from her. She would take only food absolutely necessary for sustaining life, would pay no attention to the function of the bladder or bowel, and required the attendance of a trained nurse during attacks. These attacks have been much more frequent of late years, varying in severity, but always of the same type. All efforts of general and hygienic treatment carried out most faithfully having failed, an examination was determined on, and the condition of endometritis with retroversion and prolapse found. Operation, July 16, 1908. Curettage, laparotomy, sacral suspension, appendectomy. The left ovary was completely degenerated and was removed, the right was normal. Since the operation the patient has been entirely free from headaches, has had no melancholic attacks, periods normal. Although the length of time since the operation has been short, the improvement of the patient's mental outlook is so completely changed that it seems logical to deduct that the improvement is due to the methods applied to the conditions found at operation, as the operation was only resorted to after the failure of all known medical and hygienic means.

Case III.—O. L. C. Age eighteen. General health good and no bad habits. Bowels regular. Menstruation began at thirteen, flow scanty, twenty-eight-day interval, duration three days. The following symptoms have existed since puberty: General headache, very severe with the period, hysteria, delusions, crying, extremely unhappy, and ideas of ridicule. These symptoms come on in attacks with the period and are so severe as to unfit her for her schooling as she feels her companions are ridiculing her, and the mental terror is so great that she is forced to give up. Between the periods she is much better, but laterally there has been melancholia persistent after the acute symptoms have passed away. This case is a typical one in which the menstrual history is practically negative and the only thing to call attention to the reproductive organs as cause for the severe neurasthenia is the fact that the attacks come on with the flow. I examined her September, 1908, and made the following diagnosis: Endometritis, left ovary microcystic and prolapsed, chronic appendicitis. She returned to her home in the West where she was under careful medical care for three months, gradually growing worse. In December she came under the care of Dr. William H. Humeston, of Cleveland, Ohio, who concurred with me in my diagnosis, and operating, removed adenoma from the uterus, also upon opening the abdomen found the left ovary prolapsed in Douglas' pouch, microcystic with a sclerotic tunic very marked, and a warty-like growth attached to the surface. The appendix was found in a condition of chronic catarrhal appendicitis with concretions, and measured six inches in length. After the operat on the patient showed almost immediate improvement in her mental attitude, and has remained so up to the present time.

Case IV.—C. S. Age twenty-one. Applied to me September, 1907, for relief from dismenorrhea most severe in type with most intense melancholia with religious tendency. This case showed symptoms of the neurotic and hysterical type in the severest form I have ever seen. Other than the dismenorrhea and the neurasthenia and the fact that the neurasthenia was much more severe at the time of the period, the menstrual history was practically negative. Diagnosis: adenomatous endometritis, microcystic right ovary, chronic appendicitis. Operation, October, 1907, curettage, laparotomy, with removal of a portion of the right and left ovaries, which were both found cystic. The appendix was the seat of chronic inflammation, with kinking, spiderweb adhesions, and concretions. Patient improved somewhat after the operation. The following January symptoms began to return and patient gradually grew worse, suffering more pain with period and of longer duration. She began to emaciate, and in February had an attack of what, from her description, appeared to be an incomplete obstruction of the bowel. Her physician had given her morphine for the relief of the pain; and when she returned to me for treatment in May, 1908, she was emaciated in the extreme with all the symptoms possible for a neurasthenic (weight, 94). For the second time I exhausted every form of medical and hygienic care, including hydrotherapy, electricity, and massage with some benefit, but no relief of the pain and tenderness. In August, 1908, a second operation was determined on, and the following conditions were found: The remaining portion of the left ovary had formed a cyst the size of a hen's egg to which the omentum adhered. The remaining portion of the right ovary had progressed in this microcystic degeneration, and there was no healthy ovarian tissue left. The operation consisted in removal of all the degenerated ovarian structure together with a considerable piece of the omentum. The patient recovered very satisfactorily, and upon her return home was enjoying excellent health, having gained forty pounds in weight. Since her return I have received one letter stating that she had lost some weight, that the flow is irregular and at times profuse, and that at times she has returns of her neurasthenia. I am at a loss to account for the return of the flow as there was a complete double oophorectomy, and when the patient left me, four months after the operation, she was in excellent physical health. My only fear is that she may have resumed the use of morphine.

The lesions found in these cases demonstrate the reason why medical and hygienic treatment did not relieve the symptoms.

167 West Seventy-first Steet.

THE OPERATIVE TREATMENT OF PELVIC INFECTION.

BY
GEORGE H. MALLETT, M. D.,
NEW YORK.

ALL who have practised gynecology for the last fifteen or twenty years must review with interest the changes in the method of treating pelvic infections. Before asepsis and improved technic permitted the abdominal cavity to be opened with impunity, palliative measures and local applications of iodine and glycerin tampons were the sole means of relief. Then came the operative methods. When in most cases it was found that the tubes and ovaries were diseased, or were thought to be, then came immediate laparotomies, performed during the acute stage of the disease, and followed by a ruthless sacrifice of organs and a high rate of mortality. A considerable number of these patients, suffering from suppurative diseases who survived the removal of their appendages, still were not relieved until the whote uterus was also removed. The rule was then formulated that, when the tubes and ovaries were removed, the "emasculated" uterus should also be taken out. This rule is observed by many operators to-day. Then the pendulum swung the other way and so-called conservative surgery took the place of radicalism, and while many tubes and ovaries were saved, others were allowed to remain in such a diseased condition that a subsequent operation was required for their removal.

Have we at the present time attained all that could be desired in the treatment of these diseases? No, but better judgment is being used in deciding when to operate and what tissues shall be removed and what shall be allowed to remain; and the improvement has been very marked, both in the greatly reduced mortality and in the ultimate results. This is shown by the mortality records and by the diminished number of postoperative patients at the hospitals and clinics.

The object of this communication is to recall or emphasize some measures that may be used against pelvic infection to check its progress and to treat the diseased organs and tissues in such a way that they may recover their usefulness.

By pelvic infection is meant an inflammation of the endometrium, the uterus, the tubes, the ovaries, and the cellular tissue of the pelvis, caused by bacteria. Part of the pelvic organs or all may be involved in the inflammation.

Pelvic infection is the most important of all gynecological diseases and causes most of the sufferings in gynecological patients, and more deaths than all other gynecological diseases combined, and operations for its relief are more dangerous than for other gynecological conditions.

The microorganisms most commonly found in pelvic infections are the gonococcus, streptococcus pyogenes, staphylococcus pyogenes albus, citreus, and aureus, colon bacillus, tubercle bacillus.

Among the rarer organisms found are the micrococcus lanceolatus, the bacillus lactis aerogenes, and the proteus zenkeri. A very complete list of the bacteria that infect the pelvis and their relative frequency is given by Andrews (AMER. JOUR. OBST., vol. xlix, No. 2) in his report of bacteriological findings in forty-two cases of pyosalpinx, and in the carefully conducted investigations at Johns Hopkins Hospital the results of the cultures taken from infected ovaries and tubes and from the endometrium, coincided with those obtained by him.

A mixed infection may occur, consisting of the streptococcus and staphylococcus albus and aureus or the colon bacillus. From the writings of Schwartz, Noeggerath, Sanger, and Zweifel, as well as the reports from American authors, it is a conservative estimate to say that 50 per cent. of all infections of the genital tract are caused by the gonococcus. As pregnant women are infected with gonorrhea in many cases, a certain number of puerperal infections are caused by the gonococcus. Next to the urethra, the uterus is most frequently infected with gonorrhea, either directly or from the infected vaginal discharges. This bacteria infects the previously healthy and uninjured mucous membrane and almost always travels by extension into the tubes. There its progress may be arrested by a reactionary inflammation and the disease limited, or it may escape into the pelvic peritoneum and set up a localized peritonitis.

Although the gonococcus is usually confined to mucous membrane, it has been found in the uterine tissue and has caused a general peritonitis and at other times has entered the general circulation and caused arthritis and endocarditis.

In mucous membrane the gonococcus lives indefinitely, while in an abscess cavity it readily dies.

The symptoms of infection of the uterine cavity are usually preceded by those of infection of the urethra, vagina, Bartholin glands, etc. The chief symptoms referable to the endometritis are leukorrhea, pain, a feeling of weight in the pelvis, elevation of temperature and its accompanying discomforts, and irregular menstruation. These vary in proportion to the virulence of the infection and the extent of tissue involved.

Palpation shows the uterus to be slightly enlarged and very tender. After the disease becomes chronic the only marked symptoms to remain are the leukorrhea and the frequent and prolonged and painful menstruation.

In from 30 to 50 per cent. of the cases of gonorrhea the tubes and ovaries are infected. This extension may occur in several days or several months after the primary infection. The onset is marked by acute pain in the ovarian region, slight fever, painful micturition and defecation. When pus forms the patient may have chills and moderate febrile reaction.

The infection that follows labor or miscarriage or operative procedures, the introduction of instruments, intrauterine applications, etc., is usually caused by the streptococcus pyogenes, although the staphylococcus, colon bacillus, and saprophytic bacteria have been found. The same bacteria that are found in wound infection in other parts of the body are found in septic endometritis and pelvic infections.

When infection occurs from the streptococcus the local changes are slight. These bacteria penetrate the uterine wall, spread rapidly by the lymphatics or blood-vessels or by the blood circulation, and rarely by the tubes, in contrast to the mode of extension of the gonococcus. Mascagni and Poirier have shown that the uterus and its appendages, as well as the vagina, is surrounded by a dense network of lymphatics, and that the upper part of the vagina and around the cervix is more richly supplied with these vessels than the other portions of the genital tract, for here the lymphatics collect before entering the glands of the pelvic floor. The lymph-vessels of the body of the uterus either pass out through the mesosalpinx, near the ovarian attachment and up the suspensory ligament of the ovary to the lumbar glands or course down the round ligaments to the deep inguinal glands.

These lymphatics lie with the blood-vessels in the cellular tissue of the pelvis. The extent of the pelvic cellular tissue and its importance, pathologically, is clearly shown by A. von Rosthorn in the beautiful illustrations accompanying his paper, "Krankheiten des Beckenbindegewebes" (*Handbuch der Gynäkologie*, 1899).

The infection of the streptococcus, whether it results in exudates or abscesses, is usually asymmetrical, differing thus from the gonococcus.

When the streptococcus is mixed with the colon bacillus or staphylococcus there is greater local reaction than in the pure infection. The symptoms usually begin with a chill and elevation of temperature varying with the severity of the attack and generally ranging from 102° to 104° and pulse ranges from 110 to 120. Pain is usually not great until the peritoneum or periuterine tissue becomes involved, and then it is usually severe. The patient feels ill and the prostration is marked.

The uterus is larger, more doughy and tender than normal. If the infection is limited to the uterine cavity the temperature gradually falls and the symptoms subside and the uterus becomes normal; usually, however, a chronic endometritis is left.

If the infection has extended beyond the uterus, then the symptoms become those of the parts infected, as peritonitis, lymphangitis, etc.

With streptococcus infection there is little leukorrhea and no odor. When the odor is present it is due to mixed infection, usually the colon bacillus. The diagnosis can be made from the history, the general condition of the patient, and by bacterial examinations. In chronic cases the history is of still more importance in determining whether the infection has been of gonorrheal or streptococcic origin.

The gonorrheal almost always extends along the mucous membrane, causing purulent tubal inflammations or peritoneal abscesses, generally bilateral.

The streptococcic follows pregnancy, uterine traumatism, etc., and extends through the lymphatics, does not cause pus tubes as a rule, and is asymmetrical.

In discussing the operative treatment of pelvic infection, it is not my intention to consider prophylaxis nor palliative measures; not from a lack of appreciation of the importance of these measures, but from lack of space. Since it is a matter of common observation that a certain proportion of cases of pelvic infection recover spontaneously, all means should be used to bring about this happy termination. Should the case be one of gonorrheal endometritis, our efforts should be directed toward limiting the disease to that tissue and preventing its invasion of the tubes. The means to be employed are the so-called palliative, and consist of the recumbent position, ice-bag or hot-water bag to lower abdomen, hot vaginal douches, liquid diet, saline cathartics, and opiates when needed. Should suppuration reach the tubes notwithstanding our efforts, the same palliative means may be used until resolution occurs or a pyosalpinx forms. If resolution does not occur the case becomes an operative one. If the diseased structures are to be attacked through the abdominal route, then the operation should be delayed until the case becomes chronic and the pus sterile, as indicated by the temperature. A disregard of this rule was the cause of the high mortality in these cases in former years.

The writer believes the best way to treat this condition—tubal infection—is by vaginal section and drainage, for this can be done with safety during the acute stage and the necessity for waiting until the tubes and ovaries are distended with pus and damaged almost beyond repair, can be avoided.

As soon as any induration is felt in the floor of the pelvis or the tubes and ovaries are found to be enlarged and tender, a vaginal section should be made, regardless of the temperature. The tubes are carefully examined and the os abdominalis opened and drained. Inflammatory exudates are separated and entered with the finger whether they be in the cellular tissue or in the pelvic cavity. The technic of this procedure will be described later.

When there is pus in the pelvis the vaginal should be the route of election, because it gives better drainage, it is safer, gives less shock, and is followed by less danger of intestinal adhesions. Recovery is less complicated and more rapid than by abdominal section.

If it is desired to enucleate the diseased ovary or tube, the abdomen may then be opened at the same sitting with less danger and greater facility, or should it be necessary to perform a subsequent operation, the difficulties would in no way be increased.

In operating for chronic gonorrheal tubal or ovarian infection, it is my custom to curette the uterus and at that time to examine carefully the pelvic fornices for any induration or exudate which would indicate an involvement of cellular tissue. Should any induration be found, it should be incised and explored with finger and then drained with gauze. The abdomen is next opened and should the structural changes have gone so far in the tube as to render it useless or a menace to health, it is extirpated in its entirety or a plastic operation done for its conservation.

The treatment of pelvic injection, caused by the streptococcus, is the same in regard to the palliative means as that of the gonococcus. Some cases recover with rest in bed, cold applications to lower abdomen, restricted diet, hot vaginal douches, saline cathartics, and opiates, if needed. As the uteri of many of these cases have retained products of conception, sloughing masses, or infected blood-clots, they should be cleaned out with great care either with the finger or the blunt curette, great gentleness being used to avoid opening new avenues of infection. This should be followed by an intrauterine douche of sterilized water or a mild antiseptic. If the infection follows an operation upon the cervix or perineum, the stitches should be removed and free drainage established. However the infection has occurred, the treatment is now the same. Knowing that the infection of the streptococcus travels by the lymphatics and along the blood-vessels in the cellular tissue and rarely along the mucous membrane, the periuterine tissue and the fornices should be carefully palpated, and if any induration is found, it indicates that the process has extended beyond the uterus, and vaginal incision and drainage should immediately be performed.

When the diagnosis of pus in the pelvis is made, no time should be lost in evacuating it, whether the condition be acute or chronic, provided it is done by the vaginal route. Dense hardness in the cellular tissue usually means pus. The induration should be explored thoroughly with the finger, and the pelvic contents examined bimanually at the same time. If the pus is found to be intraperitoneal, in the tube or ovary, the culdesac is opened and the abscess evacuated and drained.

As mentioned before, it is my custom, in chronic cases of infection of the tubes and ovaries, when it is desirable to do conservative work or to extirpate the appendages, to open the abdomen, but not before having curetted the uterus and opened into the cellular tissue, should any induration be found.

In the early years of the study of diseases of women the infection of the cellular tissue was considered the prime factor in all pelvic inflammations, and all local measures were directed to the relief of this condition. That many cases resisted this treatment and remained unrelieved is not surprising in the light of our present knowledge. With the advance of abdominal surgery it was observed with such frequency that pelvic inflammation was caused by infected tubes and ovaries, that many laparotomists deny the primary infection from any other source and totally ignore the existence of pelvic cellulitis.

For some years I have felt convinced that the pendulum has swung too far toward the tubes and ovaries and too far away from the cellular tissue with its dense network of lymphatics and blood-vessels in the treatment of pelvic infection.

Since inflammation of all these tissues occur conjointly or separately, the rational method would be to direct the treatment to the tissue affected, whether it be of ovary or tube or cellular tissue, or of all combined, as frequently happens.

In recent literature little has been written about pelvic cellulitis. The German authors have recognized the condition more than have the English or American. In American text-books it is mentioned casually by some and is ignored entirely by others. The best article upon pelvic cellulitis that has come to my notice is by E. C. Dudley, in his "Principles and Practice of Gynecology," and from which I quote: "Clinical experience shows pelvic suppuration to be primarily almost always in the tube; rarely in the cellular tissue below; and if perchance an abscess be found there it usually gives evidence of having burst from the tube into the broad ligament. The above facts have led to a tendency of late years especially, among the laparotomists to deny the existence of pelvic cellulitis and to announce the triple proposition: that cases of extrauterine pelvic inflamation are, except in rare instances of puerperal origin, essentially of tubal development; that ovaritis and peritonitis are always secondary to tubal disease; and that an abscess in the broad ligament is there only when a previous infection of the Fallopian tube has forced its way through the mesosalpinx into the parametrium. In this connection, let us remember that the disease occurs in men who have no Fallopian tubes. Why should the cellular tissue of the pelvis be free when the same tissue in every other part of the body is subject to infection? Would it not be just as reasonable to assume that pleuritis is the central lesion in all pulmonary infection or that perinephritis is the essential factor in all cases of contracted kidney? The question, however, is not settled by *a priori* reasoning, Postmortem studies prove the frequent existence of acute cellulitic abscess, not only by rupture of a sactosalpinx into the parametric cellular tissue, but also by the direct lymphatic or venous route."

It is not my object to prove the existence of pelvic cellulitis as a primary infection, but rather to call attention to its existence whether it be primary or secondary or whether it be called "perilymphangitis" or "periphlebitis" and to suggest its treatment along the same lines as is employed in the cellular infections in other parts of the body. Since the infecting bacteria are the same and the tissue is the same, this seems but rational. The treatment of infected cellulitis is incision and drainage, and this should be performed whether the infection be primary or secondary to intrapelvic inflammation. In the latter case this should be done in conjunction with the intrapelvic operation, whether it be abdominal or vaginal.

Those operators who remove the uterus when both appendages are affected with suppurative disease, do so for drainage, not of the pelvic cavity, because that could be done easier through the culdesac, but for drainage of the lymph spaces and cellular tissue. This drainage could be accomplished before entering the pelvic cavity by dilating and curetting the uterus and by opening and draining the cellular tissue wherever induration is felt, and thus the removal of the uterus be avoided.

I have recorded fifty-three vaginal sections for suppurative disease of the pelvis without a death and without an accident, and in but one instance was a subsequent abdominal operation performed. The patient had a large pyosalpinx on one side, which was opened and drained from the vagina. She recovered promptly and remained well for three months. The other tube and ovary which had appeared healthy at the time of operation became the seat of active suppuration and demanded operative interference. As this patient had a fibroid of the uterus and was forty-nine years old, it was thought best to perform abdominal hysterectomy and remove the suppurating appendage at the same time. This was accordingly done, and the patient made an uneventful recovery.

The technic that I have followed in performing posterior vaginal section differs somewhat from that recommended in textbooks or from any that has come to my notice. It is briefly as follows: The patient is put in the lithotomy position and prepared as usual. The posterior vaginal wall is depressed by a perineal retractor and the posterior lip of the cervix is seized with bullet forceps and elevated until the culdesac is obliterated and the tissues put on the stretch. The mucous membrane of the posterior wall of the vagina is then seized with another pair of bullet forceps at a point about an inch and a half below the cervix and in the middle line. Slight traction upon the lower pair of forceps will raise a vertical fold of mucous membrane behind the cervix. This fold is cut transversely with a pair of sharp-pointed scissors at a point just below the junction of the vagina and cervix. The cut is then enlarged on each side and with the finger the mucous membrane is separated from the peritoneum. If it is desired to enter the peritoneal cavity, the peritoneum is put on the stretch by means of the fixation forceps and snipped with scissors. The finger is then introduced and acts as a protector and guide, while the opening is enlarged by lateral cuts with the scissors until the desired width is reached.

By this method the necessity of introducing the finger into the rectum is avoided and all tissue is felt before being divided. I have never found it necessary to make a vertical incision in addition to the transverse, in order to gain the required space. Two fingers are now passed into the pelvis and a careful examination made. Collections of pus can usually be entered with the fingers, and it is my custom to penetrate in this way all indurations whether they contain pus or inflammatory exudates and wherever they are situated and whether they fluctuate or not.

If the pus is contained in the tube and the tissues are too dense to penetrate with the finger, a long retractor or possibly two are introduced into the culdesac and the pyosalpinx brought into view and opened. All pus collections having been opened, the question of irrigation comes up. From my experience I prefer not to irrigate immediately, but after the first dressing, which is usually on the fourth day, because there seems to be less reaction and less to drain if irrigation is not practised at the time of operation. The most important feature of this operation is the drainage, and upon this depends the success of the procedure.

Formerly rubber-tube drainage was invariably used in the culdesac, but now gauze is usually employed, because experience has shown that with the latter there is less temperature, less pain, and less care is required than when the tubes are used. The rubber tube increases the suppurative process. The directions usually given in text-books and the method practised by most surgeons is to pack the cavity lightly with a strip of gauze and drain into the vagina. This often results in a rise of temperature in a few days and the premature closing of the vaginal incision, because the strip of gauze passed into the vagina, cannot efficiently drain the mass above and the vaginal incision closes down upon the strip and locks up the secretions.

The method that I have used for the last ten years, and with most satisfactory results, was suggested by Dr. E. P. Mallett. In this, rolls of gauze, made after the manner of the "cigarette drain," are used. These rolls are about one-half to three-fourths of an inch in diameter, and are long enough to reach pus cavities in any part of the pelvis. They are introduced with forceps either by sight or are guided by a finger of the other hand and passed through the vaginal incision into each pus cavity of diverticulum. The number of drains used depends upon the size and number of the pus cavities; from two to six are generally required. This arrangement of drains prevents the incision from closing and checks the hemorrhage of small vessels by pressure, and yet does not interfere with the drainage, for the secretions pass through the gauze and through the spaces between the rolls. It is my custom to use the rubber tissue covering for the rolls, to facilitate their removal, but this is not essential. The drains remain in place until the fourth day, unless there is considerable rise of temperature, and in that case they are removed earlier. When they are removed, the cavity is irrigated with peroxide of hydrogen and followed by a saline solution, and a smaller number of rolls of gauze are introduced. This dressing is repeated every second day and the number of drains diminished until the drainage ceases and the incision is allowed to close. After the operation the patient is placed in the so-called Fowler position until after the fourth day, when she is allowed to sit up.

Among the patients operated upon, collections of pus were found in one or both tubes, in the ovaries, in the tubes and ovaries combined (tuboovarian abscess). Pus was found in the culdesac, in the cellular tissue anterior to the uterus, and in the folds of the broad ligaments.

As most of these cases were hospital patients, it has been impossible to follow many of them in after-life. Within the past year sixteen were traced, and they all reported to be in good health.

One of these was a case of ovarian abscess which was incised and drained thirteen years ago, and she has remained well ever since. This case was remarkable because the tubes and other ovary appeared to be perfectly healthy, and yet the infection was undoubtedly gonorrheal, showing that the infection of the ovary probably occurred through the lymphatics.

Another patient was a chorus girl who had two large tubal abscesses undoubtedly gonorrheal. They were incised and drained seven years ago, and she has followed her vocation with comfort ever since.

In several of these cases of pus in the pelvis it was necessary to explore the pus cavity and break up the adhesions two and, in one case, three times before a cure resulted. This was done with the finger while the patient was under chloroform. These subsequent procedures were made necessary by overlooked abscesses in the pelvis or too early removal of the drains.

No subsequent pregnancy has occurred among this class of my patients.

In 1895 it was my pleasure to hear the late Dr. F. Henrotin read a paper before the American Gynecological Society, entitled "Conservative Surgical Treatment of Para- and Periuterine Septic Disease." It was a strong plea for early vaginal incision and drainage in acute cases of pelvic inflammation, and impressed me so much that I have practised that method whenever the opportunity offered. As Dr. Henrotin has said, these acute cases are seldom seen in the hospital operating-rooms, but frequently in consultation. The two cases related by him were infected by the streptococci, but as the histories of the others were not given, the nature of the bacteria is not mentioned, but the principle of early operative interference was carried out.

A certain proportion of cases of infection, whether gonorrheal or streptococcic, get well without involving the appendages or the lymphatics, and therefore the accepted teaching is to do nothing beyond palliative measures or possibly to curette until collections of pus form or systemic infection occurs; then they are operated upon with considerable risk to their lives and their pelvic organs.

The rule should be that whenever the infection has extended beyond the uterus, as shown by induration of the cellular tissue or swelling of the tubes, vaginal incision and drainage should be performed. I have followed this method in eleven cases presumably of streptococcic infection, and the results have been most satisfactory.

One was a postoperative case. The patient was a young married woman. She had been curetted, her cervix and perineum repaired. The abdomen was then opened and her appendix removed and uterus suspended, all at one sitting. The ovaries and tubes were found to be normal. There was little or no reaction, and her recovery seemed all that could be desired. On the fourteenth day, having a normal temperature, she was permitted to sit up in bed, and was to have been out of bed on the day following. She was taken with a severe chill and her temperature and pulse were found to be 103° and 110, respectively. She had no localized pain or tenderness, but felt and looked extremely ill. Twelve hours later her temperature had reached 104° and pulse 120. She was examined carefully and nothing was found to account for her condition. The cervix and perineum had healed, and the catgut sutures had disappeared. In another twenty-four hours, or two days after the beginning of the attack, her temperature in the night registered 105.8° and pulse 130. The next day or the third of her illness some induration was felt behind and to the left of the cervix. This induration was so slight that it seemed hardly possible to account for her symptoms, but no other abnormality could be found. She was immediately put under an anesthetic and the mucous membrane behind the cervix was divided with the scissors as before described. The finger was inserted into the cellular tissue and the indurated mass penetrated and drained with two cigarettes. The induration was at the base of the left broad ligament, and no pus could be distinguished when it was opened; only what appeared to be serum and some pyogenic tissue. As all else in the pelvis appeared normal, there was nothing to do but await results. Her leukocyte count the day the vaginal incision was made was found to be 30,000. In a few hours after the vaginal incision her pulse and temperature began to go down, and she improved almost as rapidly as she had become ill. On the fourth day after this operation she had another rise of temperature, this time to 103°, and it was found that the drains had been removed too soon and the secretions retained. The opening and the cavity were then enlarged with the finger and more drains introduced, and the temperature went down promptly and the recovery was uninterrupted.

Another case was that of a young married woman seen in consultation. She had missed two periods and had had an abortion induced. When seen on the third day of her illness her temperature was 102° and pulse 120. The uterus was large and boggy, but quite movable; no induration was felt in the cellular tissue. The uterus was then gently curetted and some products of conception removed. After this she improved for two days, and her temperature and pulse went down to nearly normal, but on the third day after the curetting she began to complain of intense pain in the pelvis and her temperature went up to 103°. At this time an examination revealed an indurated mass in the upper posterior wall of the vagina between the culdesac and the rectum.

The patient was immediately anesthetized and a transverse incision made behind the cervix. The finger was introduced and the mass penetrated. Bloody serum was liberated and the cavity drained with two rolls of gauze. In a few hours the pain subsided and the temperature began to go down, and by the fourth day, when the drains were changed, the temperature and pulse were normal. The patient made an uninterrupted recovery.

Another case, very similar to the last, was that of a young woman who had gone ten days over her period. She had attempted to bring this on by means of a rubber catheter containing a stylet. By standing with one foot upon the seat of a chair and the other foot upon the floor, she had passed this instrument into the uterus. The operation was followed by some bleeding and pain, but to make assurance doubly sure, the instrument was introduced again on the following day and more bleeding resulted. The next day she had a chill and high fever and intense pelvic pain and a moderate flow. She was seen by me on the seventh day. Her temperature was 104° and pulse 130. The uterus was larger than normal and fixed in the pelvis and excessively tender. An indurated, ill-defined mass was felt on the left side of the cervix. An immediate operation was advised and performed the same day. The uterus was curetted, and a posterior vaginal incision was made and the finger was worked into the tissue and the mass penetrated. It proved to be an abscess in the left broad ligament. About an ounce of pus was evacuated, and the customary drains were inserted. The recovery was rapid and uneventful.

In the three cases mentioned the peritoneal cavity was not opened, but it would have made no difference had it been, for in several other cases the peritoneum was penetrated and no harm resulted.

The treatment of acute gonorrheal salpingitis and ovaritis by vaginal incision and drainage is simplified in many cases by the fact that when suppuration occurs in the appendages, the swelling is so great that they gravitate into the culdesac, where they can be easily reached from the vagina. If the tubes are not palpable the inflammation is probably not virulent and recovery will occur spontaneously, but if the tubes can be palpated or there is induration in the cellular tissue, then vaginal incision and drainage should be performed. Care must be exercised in the after-treatment of these cases because of the tendency of the opening in the tube to close and stop the drainage, but by attention to this detail, many tubes can be saved from further disorganization and restored to usefulness.

Before performing vaginal section the uterus should always be curetted thoroughly and an application of pure carbolic acid followed by alcohol be made to the endometrium.

In this communication the writer has endeavored to call attention to the importance of early vaginal section and drainage in pelvic infections, its value in all cases of pelvic suppurative disease, whether acute or chronic, and to urge the drainage of inflamed cellular tissue by vagina, especially in those cases where the appendages are removed by laparotomy, and the uterus was formerly sacrificed in the so-called radical operation. By the use of this drainage it will not be necessary to remove the uterus for the relief of symptoms. The uterus in itself is a relatively harmless organ, and the symptoms attributed to it are caused by periuterine inflammations and adhesions—much more frequently by the periuterine inflammation than by adhesions.

The patients suffering from pelvic infection are usually young women, and the loss of their ovaries and tubes is of considerable importance to them as the symptoms of artificial menopause are usually pronounced and the atrophic changes frequent; but the ultimate results in this class of cases is fortunate as compared with some that come under observation after the uterus has also been removed. In them senile atrophy occurs to such an extent that sexual intercourse is prevented or interfered with or they are rendered miserable by a senile vaginitis that resists all forms of treatment. They become mentally morbid and are unhappy in their domestic life. One of these patients will do more to prejudice the laity against surgery than all that could be written or said by mental healers or osteopaths.

At the present time these unfortunates are not so numerous as in former years. If by early surgical intervention disease may be arrested and tissue and organs saved, then an important step in true conservatism has been made.

244 West Seventy-third Street.

THE PREVENTION OF PERINEAL LACERATIONS.*

BY
E. K. MACOMBER, M. D.,
Amsterdam, N. Y.

My apology for choosing this subject is that it has received too little attention. We are all apt to interest ourselves in some rare condition that is seldom met by the general practitioner and to neglect the details of our every-day practice, many of which could be vastly improved.

Hirst gives three causes for laceration:

1. A relative disproportion in size between the outlet of the birth-canal and any part of the fetus, which makes the escape of the latter a physical impossibility without a laceration.

2. Such a rapid expulsion of any part of the fetal body that the maternal tissues cannot gradually dilate, but give way before the sudden strain imposed upon them.

3. Any abnormality in the mechanism of labor which forces the presenting part backward against the center of the perineum and prevents its propulsion forward under the symphysis pubis.

In the first category may be classed abnormal presentations which may or may not be corrected.

Lacerations from the second and third causes can, as a rule, be prevented by the proper treatment and the number resulting from the first cause can be greatly reduced.

As to the frequency of lacerations, Olshausen finds 21 per cent. in primiparæ and 4.7 per cent. in multiparæ. According to Winkel, 11.5 per cent. of primiparæ need repair of the perineum. Hecker finds only 14 per cent. of women bearing the first child after the age of thirty requiring the repair of the perineum, evidently a difference in judgment as to those needing repair. J. C. Wood, in his "Gynecology," states that one-third of all primiparæ have lacerations. Shroder found a rupture of the perineum in 34.5 per cent. of primiparæ and 9 per cent. of multiparæ.

To describe the different methods proposed by obstetric writers for the prevention of injuries to the perineum would take much time and be of no practical value.

The methods generally in vogue at the present and probably the earliest methods used may be summed up in these two principles: support the perineum and retard the expulsion of the child.

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*Read before the Medical Society of Amsterdam, May 4, 1909.

In 1810 Michaelis advised incision of the posterior commissure, while Eichelbery advised making the incision on the sides, the operation now known as episiotomy. These methods are now branded as meddlesome midwifery and should be relegated to the dusty shelves of obscurity and forgotten.

Meigs, in his "Treatise on Obstetrics," published in 1849, says, "I have waited six hours by the bedside after the vertex has begun to jut out between the labia, the patient all the while suffering severe labor pains which vainly tended to expel the head." I think it would be very difficult at the present day to find a practitioner who would wait that length of time if he had his forceps with him. He also states that a towel should be held against the perineum to support it during the pains, also to hold the head back if pains are strong and there is danger of laceration.

Goodell advises introducing a finger into the rectum and raising the head during the expulsive effort. This procedure is not consistent with aseptic midwifery, and besides it is more likely to cause rupture than to prevent it.

Jewett, in the "American Text-book of Obstetrics," describes very minutely how to manage the second stage of labor to prevent laceration by placing the patient on the left side and holding the fingers and thumbs in a certain position on the head and on the maternal parts. These minute details appear well in print, but in practice the results do not justify the means.

The method discovered by the author in July, 1899, and published in the *Medical Council* in September of the same year, is as follows: After the cervix uteri is dilated to the size of a silver dollar or a little larger and labor pains are active, the dilating bag of Champetier de Ribes, or one of its modifications, is boiled, lubricated, and introduced into the vagina. A bulb syringe is connected with the tube, and while the bag is held in place with one hand the other slowly forces a warm antiseptic solution or sterile water into the bag until it is filled. The tube is then secured by clamp or stop-cock and the bag left to be expelled. The bag must be filled slowly, as the rapid dilatation causes increase of pain and may do harm to the maternal parts. Fifteen to twenty minutes should be occupied in filling the bag.

The author has been in the habit of administering a little chloroform while filling the bag, especially with nervous patients. When hyoscine and morphine have been used, chloroform is not necessary. A large pad of gauze or cotton is wrung out of an antiseptic solution, a hole made through the center and slipped over the tube against the vulva. After the bag is introduced, it must be held during each pain to prevent premature expulsion which might cause laceration.

The following are some of the advantages of the bag: If the pains have previously been of cramp-like character, they are at once changed to the expulsive type, which many patients say is a great relief. For a short time the pains are more frequent and harder, but as the parts bcome accustomed to the distention, the contractions appear at normal intervals.

With the bag in place every pain accomplishes a double purpose. While the head is dilating the cervix and wedging its way through the superior strait, the bag is being crowded down by the head and is slowly dilating the soft parts. Thus the second stage is materially shortened.

The cervix which is pressed between the bag and the head dilates more rapidly than it otherwise would.

The presence of the bag in the vagina stimulates the secreting glands and thus keeps the passage well lubricated.

You all know how frequently, during the second stage, the pains become inefficient. The patient does not seem to have the power or the desire to bear down. Then is the time we usually administer oxytocics and endeavor to stimulate the lagging pains by friction over the abdomen or by pressing the finger against the cervix, or if in a hurry instruments are applied and a laceration is the result. With the bag these measures are usually unnecessary as we have complete control over the pains. If we think a pain is a little tardy a slight pull on the bag will immediately bring on the pain. If the pain is too short, slight traction on the bag will cause the patient to bear down as long as desired. If the expulsive efforts are too strong, then the bag should be held back in order to prevent stretching the perineum too rapidly.

Many instrumental deliveries can be avoided and labor terminated naturally in a reasonable length of time and without laceration by using the bag.

The direction of the force is always toward the outlet and not toward the center of the perineum, as sometimes occurs.

The shape of the bag will at once appeal to you as being the best means for dilating the perineum. If you were going to split a log you would not hit it with the head of the ax, but with the blade. If you were going to run an engine through a snow drift you would put on a snow plow. If you were going to dilate the urethra you would not try to introduce the largest sound first, but would choose one which would pass easily, and gradually increase the size till the largest one could pass. Why, then, expect a child's head to pass safely through a narrow vaginal outlet without rupturing it? Is not the bag a more practical dilator? The child's head is rigid, unyielding, and blunt; the bag is flexible and conical.

The head comes down during the pain and then recedes, making the dilatation spasmodic. The bag exerts continuous pressure and thus paralyzes the muscles. The head is suddenly forced through an undilated outlet. The bag is gradually expelled, dilating as it passes. It is not because the perineum is incapable of dilating sufficiently to allow the child to pass that it is lacerated, it is because the child is forced through before it has time to dilate.

As the bag is about to be expelled, it should be constantly held in order to get the full benefit of its largest diameter. The time occupied in expelling the bag is usually from one to two hours, depending on the elasticity of the tissues. The head usually follows close behind. In one case the effort which expelled the bag brought head and shoulders of the child. In another case after the bag was expelled the patient raised on her elbow to vomit. The effort of vomiting expelled the head without any abdominal pain.

When the presenting part is much larger than the bag, a little chloroform should be given as it passes over the perineum. The head should be held back, and between pains gradually worked out by carefully pressing the tissues back around it while it is being pushed up from under the pubic arch by a hand placed behind the anus.

It is not necessary to state that great care must also be exercised in delivering the shoulders, as a laceration may occur at this stage after the head has passed through safely.

In some cases it becomes necessary to use forceps. In this event the application and extraction are much facilitated while the danger of laceration is greatly reduced.

The author's record with the bag is as follows: The bag has been used in eighty-seven cases, all primiparæ except two, each of which had shortly before had a perineorrhaphy. Out of the eighty-seven cases twelve were instrumental, and out of the whole series there were but three lacerations, which gives approximately

3 1/2 per cent. In the first case the bag was expelled prematurely while not being held. This caused a slight laceration which was somewhat enlarged by the birth of the child. The second case was instrumental. The third was a very difficult instrumental case, the laceration being caused by the forceps slipping off.

While at the New York Post-Graduate in 1902 it was the author's privilege to listen to a lecture by Dr. John Osborn Polak, of Brooklyn, in which he demonstrated the use of the bag for the prevention of laceration. He had incidentally discovered its use for this purpose by using it inside the uterus to replace the bag of water in a dry labor. The case progressed so smoothly that the bag was allowed to remain till it was expelled. The results obtained in this case influenced him to use it in other cases as a perineal dilator, and at the time referred to he was using it in nearly all primiparæ in his private and hospital practice.

In a recent letter from Dr. Polak, in reply to inquiry regarding his experience with the bag, he states that he is still using the modified Champetier bag which is now known as the Voorhees bag; that his results are less than 5 per cent. of lacerations in primiparæ against about 30 per cent. in unprepared vaginæ. He says: "I find it difficult to educate men in the use of the bag, and unless it is done cleanly it increases risk of infection."

The author has never had a case of infection following the use of the bag. If the genitals are properly cleansed and the bag boiled there is no reason why infection should result.

Dr. Richard C. Norris, in the AMER. JOUR. OBST., September, 1908, says: "It is my experience that next to a disregard of aseptic technic, the early application of forceps before complete dilation is the general practitioner's greatest obstetric sin of commission. His sin of omission is his failure to use skillfully a dilating bag. The practical application of the methods for opening the birth canal, *secundum artem*, are the most important advances in modern obstetrics and not the least of these advances are the improved dilating bags to assist a delayed labor and prevent in great measure the lacerations that formerly so frequently resulted from instrumental aid to delivery. 'Meddlesome midwifery' was an apt term for the preaseptic days. 'Helpful midwifery' should now be substituted, but only by those who can invade the birth-canal with a technic equal to that of the abdominal surgeon."

He further says: "To stimulate uterine contractions and hasten dilation I ordinarily use the Voorhees bag. When a forceps operation is likely to follow, the Pomeroy bag is chosen for primiparæ. Its efficient dilation of the lower birth-canal surpasses all other means for that purpose; its only drawback being the necessity for an anesthetic to relieve the pain caused by its introduction in primiparous women."

In conclusion I wish to say that there is no method known to medical science which gives us such complete control over the second stage of labor, so effectually prevents lacerations of the perineum, and gives us the desired end results as does the intelligent use of the hydrostatic bag.

So far as the author has been able to ascertain, the article in the *Medical Council*, Aug., 1899, pages 270 and 271, was the first publication of this method for the prevention of perineal lacerations.

145 East Main Street.

INDUCTION OF LABOR AT TERM AS A MATTER OF ROUTINE.*

BY

ADAM H. WRIGHT, B. A., M. D., M. R. C. S. (Eng.),

Professor of Obstetrics, University of Toronto,
Toronto, Canada.

For the purposes of this paper it will be considered that the duration of an ordinary pregnancy is about 270 days, or nine calendar months, at the end of which time the patient has reached full term. It will also be supposed that pregnancy may be, and is frequently, prolonged three, four, or five weeks after term.

The following is a brief report of a case not unusual in obstetrical practice. Mrs. A., aged thirty-five, IV-para, suffered considerably from vomiting early in pregnancy, and other effects of toxemia at a later stage. She expected labor January 1, and made arrangements accordingly. At the end of four weeks thereafter there were no signs of labor. Patient became very weary, sleepless, and depressed. Her husband became cross and angry, as he wanted to go to British Columbia, but was afraid to leave his wife before confinement on account of her serious condition. Apart from this disappointment he was not pleased about paying $18.00 a week to the waiting nurse who was engaged for January 1. The accoucheur started for Europe January 28, leaving in his place, however, a competent man. The newcomer had rather a sorry time for five days, but was much pleased when labor commenced, February 2. The labor was prolonged and very difficult, forceps being used finally. The child, well-formed, healthy-looking, and weighing 12 1/2 pounds, died in half an hour. The mother was seriously ill for many weeks, confined to her bed for four months, and now, four years after, has not fully recovered strength.

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*Read before the Toronto Academy of Medicine, February 18, 1909.

This case illustrates very well the fact that unduly prolonged pregnancy involves serious danger to mother, and child, and great inconvenience and worry to friends, nurse, and physician.

These evils are generally recognized, and many obstetricians say we should induce labor before grave dangers arise, but the recommendations made are not sufficiently definite to be of much use, especially to general practitioners. The majority of obstetricians consider that the induction of labor is a serious interference with Nature's work, involving some danger. If, however, we can perform the operation in such a way that it causes no danger, or at least very much less danger than the prolongation of the pregnancy, to the patient, we might justly conclude that early interference after term is not only justifiable but advisable. Those who have given up the barbarous methods adopted in so-called accouchement forcé are now inducing premature labor by simpler means and with much less danger to patients as compared with the results of a few years ago.

During the last three years I have followed a rule which I have been reluctant to describe until I had sufficient experience to enable me to recommend it with confidence to others. Thus far I am well pleased with the results. My rule is to commence *to induce labor within three days after the patient has reached term as a matter of routine in all cases.*

The following reports will illustrate to some extent the methods employed and the results obtained.

Mrs. B., aged thirty. Second pregnancy. Expected confinement June 10. On the evening of June 10 the nurse was summoned, and on her arrival prepared the patient for labor. On the following morning a vaginal tampon was introduced, after which the patient got up and went about the house as usual suffering no inconvenience from the tampon. Next morning, June 12, the tampon was removed and another introduced.

When this was removed on the following day, June 13, the cervix was softened, os softened and slightly dilated, pelvic floor and vulva softened and dilatable. A bougie was then introduced into the uterus and a tampon into the vagina. Uterine contractions commenced about midnight, fourteen hours after introduction, and the child was born four hours after. Easy labor.

Mrs. C., aged forty. Fourth pregnancy. Had one convulsion in second month and afterward serious symptoms of melancholia. When five months advanced, a consultation was held, but it was decided not to empty the uterus then. Expected confinement July 14. No sign of labor July 15. After preparation a vaginal tampon was introduced. On the next day, July 16, the tampon was removed and a second introduced. Labor commenced six hours after, the parts being fully dilated in five hours. Easy forceps delivery.

Mrs. D., aged thirty-two. Third pregnancy. Expected confinement August 15. No sign of labor August 18. Introduced tampon, and the patient got up and went about as usual. Next day, August 19, removed tampon and introduced second tampon. August 20, removed this tampon and introduced bougie. There was some resistance after the bougie had been passed apparently three inches within the uterus, but with a little coaxing this was overcome, and the bougie was pushed to the fundus. The membranes were ruptured high up, and the amniotic fluid commenced to discharge while the tampon was being introduced into the vagina. The operation was finished at 11 A. M. Labor commenced at 1 P. M., and the child was born at 4 P. M. Easy labor.

It was noticed in these and other similar cases that it was easy to induce labor at term. The patient is not, as a rule, excited or alarmed. It is only necessary to say, "We will not do much, but we wish to assist Nature in bringing on labor." After the tamponade the patient can generally go about and do her ordinary work, and sometimes does not even know that the vagina is plugged. As a rule, she does not know after the introduction of the bougie that anything of the sort is in the uterus. After such introduction, however, it is not considered advisable to allow the patient to walk about. The vaginal tampon appears to have to a two-fold effect: First, it softens and dilates the cervix and tends to cause uterine contractions. Second, it softens and dilates the vagina, pelvic floor, and perineal body in a way that makes expulsion or extraction through these parts much more easy than under ordinary circumstances.

METHODS OF PROCEDURE.

It will be noticed that the methods employed are not exactly those of Krause or Schauta, but are a combination of the two. The plan (so far as I know), first recommended by Schauta, of inducing abortion and labor by vaginal tamponade would always be admirable if it were effectual. Many who have tried it say that it is practically useless. But do such men understand Schauta's method? Certainly, many do not. In the first place, it may be stated that the vagina cannot be properly plugged while the patient is lying on her back or on her side. The patient must be put in Sim's position. The perineum and pelvic floor must be thoroughly retracted by a Sim's speculum, and the vagina properly ballooned, so that its vault being thus distended may be completely filled by the material used for packing. It is only necessary to pack tightly about the upper two-thirds of the vagina. The mistake commonly made of packing the entrance of the vagina tightly generally causes great pain, and frequently retention of urine.

As before mentioned, after this minor operation is performed the patient may walk about with little or no inconvenience. The material used for packing is 5 per cent. iodoform gauze or a rather fine iodoform cheesecloth.

In introducing a gum elastic bougie (11 or 12, English size) the safest way is to place the patient on her back, introduce a weight speculum, seize the anterior lip of the cervix with a Volsellum forceps, pull slightly, pass in the bougie, and push it up between the membranes and the uterine wall to the fundus if possible. Frequently, we do not use the weight speculum, but introduce two fingers of one hand, place the tips behind the os, and pass in the bougie over these finger-tips. This method was adopted in the case of Mrs. D., but it will be noticed that the introduction of the bougie was followed by an outpour of amniotic fluid. It may appear to some inconvenient and awkward, when both the bougie and gauze are used, to place the patient on her back for the introduction of the bougie, and then in the semiprone position for the vaginal tamponade. This, however, is a small matter, especially if one is assisted by a skillful nurse.

It may be said that we cannot always tell when the patient has reached term. That, of course, is true, and such uncertainty may cause some perplexity. Under such circumstances we may find that the cervix is "taken up," and if so we need not delay. In any case it is better, as a rule, to deliver two weeks before term than to wait for four or five weeks after term.

In conclusion the following recommendations and explanations are made:

Induce labor in all cases within two or three days after the expected date of confinement without waiting for any signs of labor.

First plug the vagina according to the Schauta method, making a special effort to pack the vault tightly.

After packing allow the patient to get up and go about if she wishes.

Remove the tampon in twenty-four hours, introduce a new plug, and again allow the patient to get up and go about if she chooses.

Remove the second tampon in twenty-four hours after its introduction.

If by this time labor has not commenced it is generally advisable to pass a bougie into the uterine cavity before introducing the third tampon.

In such cases we have found that labor always commences shortly after this Schauta-Krause operation.

In a fairly large proportion of cases the use of the bougie has not been found necessary, as labor comes on shortly after the first or second vaginal tamponade.

30 GERRARD STREET, EAST.

INVERSION OF THE UTERUS OF TWO YEARS AND FOUR MONTHS' DURATION CURED BY POSTERIOR COLPOTOMY AND POSTERIOR SECTION OF THE UTERUS.

BY
EDWARD SEALY, M. D.,
Newark, N. J.
Attending Surgeon to the Hospital for Women and Children.

My purpose in presenting this paper is to place upon record an example of a rare condition and also to offer testimony to the superior merit of a particular method for its relief.

Inversions of the uterus following parturition are naturally classified into cases of very recent occurrence, and those of a duration longer than a few days. Most of the recent cases are susceptible of remedy by taxis, and it is to those of longer duration that my comments upon operative measures will refer.

February 1, 1909, there appeared at my clinic at the Hospital for Women and Children, Mrs. A. F., who gave the following history: Married nine years, twenty-nine years old. She had had three children, normally except the last, which was born September 27, 1906

The head presented, but owing to some unascertained dystocia, natural delivery could not be accomplished, and internal version was performed under anesthesia. Her attending physician introduced his arm to the elbow, and bringing down a foot succeeded in delivering a living child. The treatment of the third stage could not be learned.

Recovering from the anesthetic, the patient suffered agonizing pain which continued until the tenth day, and which could be only partially relieved. She flowed continuously, with exacerbations at menstrual epochs until the date of her operation, a period exceeding two years and four months.

The appearance of the patient indicated profound anemia, and she complained of great physical weakness.

The results of examination were as follows: My finger entering the vagina came in contact with a hard but elastic mass, large toward the vulvar outlet, and narrowing upward until disappearing, its narrow neck being encircled by a hard ring, evidently the cervical ring. The finger when withdrawn was found covered by fresh blood. My first impression was that of a tumor extruded from the uterus. But bimanual palpation convinced me that I had to deal with an inversion of the uterus of long standing. This opinion being supported by that of my colleagues, the patient was invited to enter the hospital for operation.

Debating what to do for my patient, the various historic methods were carefully reviewed.

Taxis with its modifications has an unsatisfactory history, except in very recent cases. In chronic cases it has had some success, many failures, ruptures of the vagina, and deaths. The operator has frequently been forced to do hysterectomy.

A very serious argument against taxis is that if nominally successful—that is, if the operator succeeds in reinverting the uterus—the organ will have been bruised nearly, if not quite, to the point of destruction of its autonomy as living tissue, and metritis, probably septic and possibly fatal, is the likeliest result.

Elastic pressure, alone or with taxis, has been sometimes successful, but has proved a very uncertain and unsafe method, several cases of fatal peritonitis from elastic pressure alone having been reported, and one fatal case in the hands of so expert an operator as Lawson Tait.

Rejecting taxis and elastic pressure as uncertain and unsatisfactory, the various cutting operations were carefully considered.

The brilliant method of T. G. Thomas, consisting of abdominal section followed by dilatation of the cervical ring from above, has had more failures than successes.

Discission of the cervix, combined with taxis, has succeeded in an inversion of three months' standing, but it seemed to me that this success was due to fortunate conditions that do not usually prevail, and that the method would be likely to fail in a case of longer duration.

Küstner's operation of posterior colpotomy followed by posterior median incision of the uterus, leaving the cervical ring intact, the fingers being introduced through the two incisions for the purpose of dilating the neck, has had 50 per cent. of failures.

Anterior colpotomy with anterior discission of the uterine wall has proved a successful operation in the hands of several operators, but a very serious objection is the unfavorable situation of the anterior incision for drainage, which I believe should never be omitted.

This objection led to its rejection in favor of posterior colpotomy with median discission of the entire posterior wall, an operation first suggested by Piccoli (*Ann. de Gynéc.*, 1901). Piccoli never had an opportunity to perform the operation, but his suggestion was made with such definiteness and with so accurate an appreciation of the difficulties and principles involved as to entitle him to the honors of priority.

The operation was first actually performed by Josephson, and then by Morisani, Enrico Sava, Westermark, Barelius and Heinricious, the success being complete in each case.

Hysterectomy was viewed as an unfortunate mutilation, but was held in reserve for use in the event of uncontrollable hemorrhage.

My patient entered the hospital February 2, 1909, and after careful antiseptic preparation for either vaginal or abdominal section, was placed upon the table for operation two days later.

Under ether anesthesia and in the dorsal position, a weight speculum introduced in the vagina exposed the red, hemorrhagic body of the inverted uterus.

Search was made for the orifices of the Fallopian tubes and that of the left tube was located and probed to a depth of three-quarters of an inch.

After a tentative effort at taxis, two forceps were placed upon the posterior edge of the cervical ring, and the cervical tissue incised between them. Another brief attempt at taxis failing, the incision was extended about three-quarters of an inch along the wall of the uterus, and deepened to, but not through the peritoneum. Taxis again failed, and it became evident that the resistance to reinversion lay not in the neck alone, but in the entire uterine wall.

The posterior vault of the vagina was then incised and the opening into the peritoneal cavity enlarged by the fingers as is customary in vaginal hysterectomy, and a pack of iodoform gauze placed in the culdesac.

A finger was then introduced through the culdesac incision into the cavity of the uterus, and upon it as a guide the posterior uterine wall was divided to the fundus, care being exercised to keep the incision in the median or nonhemorrhagic line, when it was found easy to reinvert the uterus. The incision was not made to its full length at one stroke, but consisted of several short incisions, interspersed with taxis. It was only when the fundus was reached that resistance to reinversion was overcome.

The uterine incision was closed by deep and superficial sutures of chromic gut, from the fundus to the vaginal attachment, the gauze removed, and the uterus turned through the culdesac opening into the abdominal cavity. The cervical portion was then sutured with chromic gut, the opening into the culdesac narrowed by sutures, and fresh gauze placed in the culdesac and uterus.

There was no troublesome bleeding and little shock.

The patient was put to bed in the Fowler position, and the usual after-treatment for vaginoperitoneal operations carried out, the gauze being removed in a few days.

Prompt and perfect union occurred.

There was a perfectly normal menstruation during the fifth week, and the progress of convalescence was uninterrupted. The patient gained steadily in color, strength, and weight, and at the end of seven weeks returned to her home, a well woman.

There are conclusions I have formed that are shared by the surgeons who did me the honor to witness the operation, and that I will briefly state:

1. The operation is not difficult, one step suggesting another, and the work moving forward by a natural sequence of procedures.

2. There is no greater risk than that attaching to any vagino-peritoneal operation.

3. Success is inevitable, any inverted uterus, of however long duration, being capable of rapid and easy reinversion.

In the minds of the many eminent men who have originated methods for the reinversion of the inverted uterus, a predominant idea, and one that will go far to explain their indifferent success, appears to have been that the only obstacle to reinversion lay in the contracted cervical neck.

Matthews Duncan and Piccoli seem to have been the only exceptions.

Matthews Duncan was even inclined to refuse all importance to the contracted neck.

Piccoli believed that the resistance lay in the entire uterine wall, from the neck to the fundus.

My perfect opportunity to observe the exact locality of resistance has convinced me of the accuracy of the view enunciated by Piccoli and the importance of its acceptance.

A thoughtful consideration of the structural changes naturally and necessarily occurring in the muscular layers of the uterus during the prolonged maintenance of its inverted condition will render apparent the reasonableness of this view.

The problem is approximately analogous to that of inverting the normal uterus, which, without an incision equal in extent to that made in this operation, would be obviously impossible.

369 WASHINGTON STREET.

REPORT OF SIX SUCCESSFUL CESAREAN SECTIONS WITH SOME REMARKS ON THE REPEATED OPERATION.*

BY

G. M. BOYD, M. D.,
Professor in Clinical Midwifery, Medico-Chirurgical College,
Philadelphia.

THE writer has elsewhere reported fourteen successful sections, and now desires to add *six cases*, making a total of *twenty cases* operated on without fetal or maternal mortality. This small number of cases covers his experience with this operation in the last thirteen years. He feels that, owing to the simplicity of this surgical procedure, the operation of Cesarean section may be too frequently performed at the present time. It is often a mistake to end labor rapidly by section when the child's life is jeopardized, and when the child is dead, section is too frequently done to the exclusion of the obstetric operations—craniotomy or embryotomy.

The solution of the difficult problem of when and in what cases to operate (for the majority are border-line cases) was reached after 1. careful study of the history of previous labors, if any; 2. a study of the pelvis; and 3. a test of labor. The following are the histories of the six cases:

CASE I. *Generally Contracted Pelvis, with Exostosis over the Promontory of the Sacrum.*—Mrs. C., born in the United States, twenty-five years old, and pregnant for the third time, was admitted to the Medico-Chirurgical Hospital October 19, 1906. On June 12, 1902, she was delivered of her first child. The labor was long and complicated with eclampsia, and ended in the birth of a dead baby. Cesarean section was performed October 9, 1905, in the second pregnancy for generally contracted pelivis. In the third pregnancy a second Cesarean section was done November 12, 1906. The patient went into labor early in the morning of that day, and at 1 o'clock a celiohysterotomy was performed. The incision was made into the site of the old cicatrix. There were no adhesions of the omentum or between the uterus and the abdominal wall. Upon the anterior surface of the uterus could be seen a series of small depressions, the location of the sutures in the first operation. An anterior longitudinal incision was made in this case; and a male infant, weighing 6 7/8 pounds, was rapidly delivered. The patient made a good recovery, and left the hospital with her baby December 14, 1906.

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* Read at meeting of Philadelphia Obstetrical Society, May 6, 1909.

CASE II. *Funnel-shaped Pelvis.*—Mrs. K. R., aged twenty-seven, born in Ireland, a housewife by occupation, was admitted to the Philadelphia Lying-in Hospital March 9, 1907, having already been twelve hours in labor. She had had the usual diseases of childhood. Her first menstruation had occurred in her nineteenth year, and her menstrual history had always been normal. She had had her last menstrual period June 3, 1906. This period lasted three days, and was normal in character. She had had two previous labors. The first child was born May 8, 1903. This labor was very long, demanding forceps. The child was asphyxiated and lived only two days. Her second child was born June 18, 1904. This was also a long labor, demanding the use of instruments, and resulted in the birth of a dead infant. Her family history was negative.

On examination, the patient was found to be well nourished, and there were the usual signs of normal pregnancy. She was evidently at term. The abdomen was somewhat pendulous. On abdominal palpation, the fetal ovoid could be easily outlined. The head was found at the brim of the pelvis, but was not fixed. The dorsal plane of the ovoid was felt on the right side, and the fetal heart on the same side. A study of the pelvis showed a general contraction of the internal measurements, resembling somewhat an Irish, or funnel, pelvis. After twenty-four hours' labor, without progress, section was decided upon. This decision was easily reached, taking into consideration her previous history of two hard labors, ending disastrously for the child; and it was the desire of the mother to save her infant. Celiohysterotomy was performed, and no attempt was made to sterilize the patient. The child, in vigorous health, was rapidly extracted. Its weight was 8 1/2 pounds. The patient made a good recovery, the only complication being an infection of one stitch. She left the hospital three weeks after the date of operation.

CASE III. *Generally Contracted Pelvis.*—Mrs. H. S., aged thirty-two years, white, a second time pregnant, was admitted to the Philadelphia Lying-in Charity July 22, 1907. She had first menstruated at her sixteenth year, and had always been normal in this respect. Her last menstruation had occurred October 28, 1906. This period was four days in duration. She had had one miscarriage at the third month, and one labor at term, about three years before. This labor had been very prolonged, and had finally resulted in a Cesarean section, which was performed in the Episcopal Hospital, Philadelphia.

External examination showed that the patient was near the end of pregnancy. A large median cicatrix of the abdomen showed the extent of the previous abdominal incision. The fetal ovoid was easily traced, and the head was found to be movable above the brim of the pelvis. The uterus seemed to be adherent to the abdominal wall. The pelvic measurements were as follows: interspinous 24 cm.; intercristal 27 cm.; the external conjugate, 19 cm. The dorsal plane was felt on the right side, and the fetal heart in the same position. On account of the previous history, an elective Cesarean section was decided upon, and was performed July 23, about one week prior to the term. Very extensive omental and utero-abdominal adhesions were found. It was necessary to make the second uterine incision at a higher plane. The child was easily removed and was in a healthy condition. Its weight was eight pounds. The patient made an uneventful recovery, and left the hospital August 10, three weeks after her admission.

CASE IV. *Generally Equally Contracted Pelvis.*—Mrs. M. C., aged thirty-five, married ten years, was admitted to the Medico-Chirurgical Hospital April 10, 1908. Her *first child* was born in 1901. It was premature and died. The *second child* was born in 1902. The labor, at term, was difficult. The child, however, lived. The *third abor* was in 1904. It was prolonged, and ended in the death of the infant. The *fourth labor* was also very difficult. After long and excessive traction, a second stillborn infant was delivered. The patient, on admission to the hospital, was pregnant for the *fifth time*, and was advanced in the last month of gestation.

With this history of the previous difficult labors and as the patient was very anxious for a living child, an elective Cesarean section was performed April 1, 1908. An anterior longitudinal incision was made, revealing the soft placenta. This was separated on the left side of the incision, and the child was quickly extracted. The patient made a rapid recovery, leaving the hospital in ten days with her healthy infant.

CASE V. *Dwarfed Pelvis.*—Mrs. R., aged twenty-six, born in Germany, was admitted to the Medico-Chirurgical Maternity January 1, 1909. The woman was a primipara, only *three feet ten inches in height.* Puberty had occurred at her eighteenth year, and her menstrual history was normal. She had had her last menstrual period April 1, 1908, and was, on admission, within two weeks of term. The pelvis was symmetrical, but exceeding small. The measurements were as follows: Interspinous, 21 cm.; intercristal, 22 cm.; external conjugate, 14 cm.; internal conjugate, 5 cm. The fetal ovoid was easily outlined. The head was movable and bulged over the pubic symphysis. The elective celiohysterotomy was performed for the absolute indication. A longitudinal incision through the uterus was made, cutting down upon the placental site. Profuse hemorrhage followed, which soon ceased after the extraction of the child. It was alive, and weighed five pounds. To insure drainage in this case, slight manual dilatation of the cervix was made by slipping the finger down through the internal os. The convalescence was uneventful, mother and infant leaving the hospital three weeks after the date of operation.

CASE VI. *Generally Contracted Pelvis.*—Mrs. T. D., married, a secundipara, seen in consultation, was admitted to the Philadelphia Lying-in Charity January 5, 1909. She had been in labor twenty-two hours. The membranes were ruptured, and the cervix well dilated. Her first labor had been long and difficult, ending in craniotomy. The vertex presented, the occiput to the right and posterior. The head was at the brim and fixed. External measurements: Interspinous, 23 cm.; intercristal, 26 cm.; external conjugate, 17 cm.; and internal conjugate, 8 cm. The condition of mother and child was good. A careful examination under ether and a tentative forceps traction were made without success. Failing in this, a celiohysterotomy was performed. An incision six inches in length was made in the abdomen. Then a longitudinal incision was made through the uterus, and a living child weighing eight pounds was delivered. The patient left the hospital at the end of the second week, fully recovered.

All of these cases were operated on for varying degrees of contraction. In three cases the elective operation was performed. The others had a labor test of seven hours, twenty-two hours, and twenty hours, respectively.

Cases I and III were repeated sections on the same patients. We have had, in all, five repeated sections. It may be of interest to review these cases and consider this phase of the subject. We shall take the liberty to draw from a paper on this subject already presented to this society:

Green, in the American Gynecological Society's Transactions, vol. xxviii., 1903, concludes his article on the "Repetition of Cesarean Section in the Same Patient," with the following remarks:

"I venture to assert that the only safe and moral ground for the medical profession is that based on medical science, uninfluenced by sociological considerations. If a woman comes to Cesarean section and recovers, she and her husband, if she has one, should be informed of her condition and of the prognosis and treatment in the event of a future pregnancy. If such a pregnancy ensues, the responsibility of treatment rests with the obstetric surgeon, but the responsibility for the condition rests elsewhere."

Whitridge Williams distinguishes between pauper patients and women in the upper walks of life. He is reported to have said:

"I do not believe that we are justified in allowing pauper patients to be subjected to the repeated Cesarean section, unless they particularly desire it." As regards the others, he is reported to have said: "They should be made to share the responsibility with the physician. In such cases the husband and wife have the right to demand sterilization; although I should earnestly dissuade them from it after the first operation, and point out to them the possibility of the subsequent death of the child and the absolute impossibility of having another after such an operation. If, however, the patient requires a second operation, the matter should be left almost entirely in her hands; but my advice would tend in the direction of rendering her sterile at that time, as no matter how favorable our results may be, an occasional death is bound to occur."

If the maternal mortality in this operation to-day were 30 or 40 per cent., then it would not be right to repeat the section; but when it has been reduced to as low as 5 or 6 per cent. (and in my own series, to a nil mortality), the question is altered. Especially is this the case when we know that the percentage mortality in repeated sections is often lower than in the first operation. Monroe Kerr, in the AMER. JOUR. OBST. for June, 1905, reports thirty Cesarean sections; and his views agree so fully with my own that I shall take the liberty to quote him. He states:

"*First*, A patient should be sterilized by hysterectomy if labor has been in progress long or if there is the probability of her having been infected.

"*Second*, A patient should be sterilized, and preferably by hysterectomy, if she has any organic disease, such as valvular disease of the heart, phthisis, etc., or if she is constitutionally very debilitated.

"*Third*, With the good results now obtained by Cesarean section, and especially in cases where the operation is repeated, strong, healthy, uninfected parturients should not be sterilized.

"*Fourth*, As regards how often the operation should be repeated, that is a matter which at present must be decided by patient and medical adviser. I am, however, inclined to agree with Williams that if a patient has undergone the operation twice or thrice, she should be sterilized."

The dangers of repeated Cesarean section have been recently studied by Wallace (*Obstetrics and Gynecology of the British Empire*, vol. ii, p. 555). He says: "Taking into consideration sixty modern cases, Cesarean section was performed twice in each of forty-three cases three times in each of fifteen cases; four times in one case, and five times in one case." The mortality in the sixty cases works out 9.5 per cent. Kerr collected nineteen cases with only one death, a mortality of 6.3 per cent. He states that one might raise the objection that successful cases are the ones most generally reported, but if one looks at the table, in which only operators who have reported series of cases are mentioned, one cannot fail to be struck with the fact that the repeated operations show a very small mortality. Wallace has also gone into the question of adhesions most carefully, and Spencer, Sinclair, Braun, and others have pointed out the value of such.

The following is a brief review of my five cases:

CASE I.—Operated upon August 12, 1897. The abdominal incision was made to the side of the old scar, and the omental adhesions were loosened when it was found that the uterus and the abdominal wall were firmly united at the lower angle of the old incision. The uterus showed no evidence of the first incision. A longitudinal incision was made in the uterus, a trifle higher than the first incision.

CASE II.—February 13, 1900, a third celiohysterotomy, and a second repeated operation, was performed in the same women before mentioned. The incision was made over the old scar. Extensive omental and uterine adhesions were now found. It was deemed unwise to liberate these adhesions, and Fritsch's transverse fundal incision was made through the uterine wall.

CASE III.—Operated upon February 2, 1903. Omental adhesions were found, and the uterus was attached to the abdominal wall. The uterus was freed in this case, and a portion of the omentum removed. A longitudinal incision in the uterus was made.

CASE IV.—Operated upon November 12, 1906. The incision was made at the site of the old cicatrix. In this case there were no adhesions. Upon the anterior surface of the uterus could be seen a series of small depressions, the location of the sutures in the first operation.

CASE V.—Operated upon July 23, 1907. Very extensive uteroabdominal and omental adhesions were found, necessitating a longitudinal fundal incision.

In two cases of Cesarean section performed by Kerr, adhesions to the abdominal wall were extensive. In one of these cases he employed Fritsch's fundal incision, and in the other the anterior longitudinal incision. Green's experience in nine cases was practically the same. In only one case were there no adhesions. Of my five repeated sections, there were adhesions in four; but in one case none were found. Fruhinsholz (*Ann. de Gynecol. et d'Obstet.*, March, 1906) discusses whether adhesions of the uterus to the abdominal wall, which are often found after Cesarean section, constitute a danger to the mother sufficient to contraindicate leaving the uterus after the first section. He concludes that this operation practised three or more times in the same individual is legitimate, and is even to be recommended on account of the very advantageous results to the child. Such adhesions, being contracted immediately after labor, leave the uterus in a more normal position than do those contracted after operations to fix a nonpregnant uterus to the abdominal wall, since the latter often change the position of the uterus. From the majority of published observations it is shown that the fecundity of the woman is not lessened by the operation. The risks of adhesion are to be considered, but they are not so great as to outweigh the value of the operation.

It will be seen, then, that the repeated Cesarean section is not more serious than the primary operation, and is even less serious. The danger that adhesions, which are so liable to form, may cause intestinal trouble is but remote. Some operators recommend a method of suturing uterine wounds to favor the formation of adhesions. This course is advocated by Sinclair and Wallace. When extensive adhesions take place there is less likelihood of rupture of the scar; and in the repeated operation it is possible to perform a subsequent operation without opening the peritoneal cavity. As time goes on, it is my opinion that, with a more nearly perfect technic, uteroabdominal adhesions will be found less frequent and less extensive. My own cases, I feel, bear out this statement, for in one case operated upon no adhesions were found.

The careful immediate preparation of the patient for section will first be of importance. In addition to the usual preparation of the abdomen, it will be wise to follow the course pursued by Monroe Kerr, of washing the vagina very carefully with lysol solution (1 per cent.). The size and position of the abdominal incision are next in importance. In my cases the incision was made below the umbilicus, and was only sufficiently large to enable me to carry out the further steps of the operation. Incision above the umbilicus is recommended by some as less likely to be followed by hernia. These operators also recommend the longitudinal or transverse fundal incision in the uterus. The advantage claimed for this method of operation is that when it is completed, the uterine wound and the abdominal wound are not in contact, for the emptied uterus takes a position below the umbilicus. If the peritoneum is closed over the uterine wound, there are no raw surfaces to come into contact and adhesions do not take place. Involution comes on almost as rapidly as in the case of a normal delivery, and eventually the uterus assumes a normal position in the pelvis without adhesions. The uterine incision, whether it be low or at the fundus, and whether longitudinal or transverse, should be a clean incision, only large enough to allow of extraction. Great care should be exercised in closing this wound. I have been afraid to depend upon an absorbable suture, and have always used fine silk. The advantages of the silk are its ease of sterilization and its strength. After placing the deeper sutures, involving the musculature of the uterus, one should make a nice coaptation of the peritoneum with superficial sutures.

In the past, when less care was exercised in closing the uterine wall, uteroabdominal fistula was occasionally reported, and rupture through the cicatrix sometimes occurred. It is now generally considered that such a danger need scarcely be reckoned with, especially among those who are strong advocates of the conservative operation. It is, however, an accident that must be taken into consideration. Richard Werth (*Berl. klin. Woch.*, July 3, 1905) has collected from literature eleven cases in the last twenty years, to which he has added a twelfth occurring in his own practice. Some of these ruptures occurred during labor, while others took place before the onset of contraction and hence were not due to pains. He believes that when the placenta is attached over the site of the scar, the wall is weakened there by the changes in the uterus due to placental implantation, so that the growth of the fetus may stretch the uterine musculature at the site of the scar. In ten of the cases collected, the rupture occurred before labor. The symptoms were those of internal hemorrhage. When this occurs the majority of operators advocate the removal of the ruptured organ by supravaginal amputation, and in extreme cases by Porro's operation.

E. E. Tull (AMER. JOUR. OBST., Dec., 1906) reports a case of second Cesarean section in a patient with rupture of the uterus at the site of the first operation. In the first section upon this patient a transverse fundal incision had been made, and the wound had been closed with three layers of chromicized gut. She was at term when seen, and the diagnosis of rupture of the uterus was not made prior to opening the abdominal cavity. The woman did not present the usual picture of shock or of severe hemorrhage. It will be seen, then, that the danger of rupture is a real one, and that if the patient is not sterilized, the uterine wound must be closed with great care. In a subsequent pregnancy the patient should be carefully watched.

1909 SPRUCE STREET.

A NEW HYDROSTATIC DILATOR.*

BY

CHARLES B. REYNOLDS, M. D.,
Assistant Obstetrician and Gynecologist to Philadelphia General Hospital; Assistant Obstetrician to Medico-Chirurgical Hospital,
Philadelphia.

(With one illustration.)

THE hydrostatic dilator I shall exhibit has for its chief advantage the ease with which it can be introduced into the parturient cervix canal without resorting to an anesthetic.

It consists of a reinforced rubber bag with a hollow rubber stem perforated with four holes and a solid rubber tip which extends to within one-half inch of the base of the bag. In its collapsed condition it resembles a right-angle triangle, the stem being a part of the perpendicular.

To introduce the bag a blunt-pointed metal stylet is inserted into the rubber stem until it impinges against the solid rubber tip; the bag is then rolled around the rubber stem as one would roll an umbrella.

The rolled bag which is about the size of one's middle finger is held in the palmar surface of the hand, with the tip of the bag even with the tips of the index and middle fingers. The labia are separated and the bag, anointed with glycerin, is inserted into the vagina until the finger tips touch the posterior lip of the cervix. Force is exerted on the stylet by the external hand and the bag gently pushed through the cervical canal. The fingers of the internal hand hold the bag in position while the stylet is being withdrawn. Sterile water is then forced through the rubber stem causing the bag to unroll and become distended. A Davidson or special syringe can be used for the purpose. When the bag is distended it is cone-shaped.

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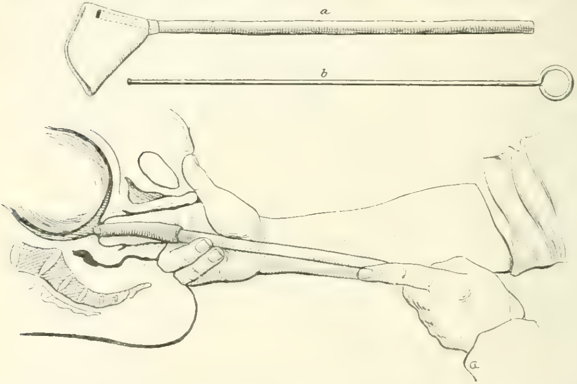
*Exhibited before the Philadelphia Obstetrical Society, Thursday, May 6, 1909.



A clamp can be placed on the rubber stem and traction made if indicated.

The bag is made in three sizes holding four, six, and ten ounces of water, respectively.

2003 DIAMOND STREET

CESAREAN SECTION AT TERM FOR A TUMOR OF THE RECTOVAGINAL SEPTUM.

BY

REUBEN CRONSON,

Visiting Surgeon, Philanthropine Hospital, New York.

MRS. J. W., twenty-eight years old, was seen March 2, 1908, by courtesy of her physician, Dr. F. E. Bauer, and the following history elicited. She was a primipara at full term. Three months previously vaginal examination by Dr. Bauer revealed nothing abnormal. Labor began February 27, when the membranes ruptured.

On vaginal examination a large mass was encountered which practically filled the cavity of the true pelvis. The mass began about one inch from the vulva, and occupied the anterior, posterior, and left lateral walls of the pelvis. Between the right lateral wall of the pelvis and the outer convex border of the mass there was a crescentic space three-fourths inch laterally and about one and one-fourth inches anteroposteriorly.

Two fingers could be passed between the right wall of the pelvis and the outer convex border of the tumor to the right side of the brim of the pelvis.

The brim of the pelvis was entirely filled by the tumor with the exception of a space about three-fourths inch in diameter to the right, where the cervix and fetal head were encountered.

The consistency of the tumor was hard, but its exact character was not determined.

The only alternative for operative interference was Cesarean section. The patient was delivered of a healthy child by Cesarean section, March 2.

As the patient was in good condition the uterus was not amputated, although she had been in labor for three days and the bag of water had ruptured three days previously.

At the operation the upper pole of the tumor could be felt in the shape of a horseshoe beneath the parietal peritoneum. It had no connection with the uterus or adnexæ.

No attempt was made to extirpate the tumor.

Her convalescence was somewhat delayed by the peculiar contour of the tumor, which prevented proper uterine drainage. But with careful nursing and intrauterine douches of alcohol and collargol her temperature gradually became normal.

She was discharged with her baby in good condition March 30, with the understanding that the enucleation of the tumor would be attended to at a subsequent date when her condition warranted surgical interference.

In the latter part of April she developed some temperature and the tumor felt somewhat boggy. On May 1, she returned with a tumor protruding through the anus for about five inches and of a diameter of about two inches.

Evidently the tumor situated in the rectovaginal septum had ulcerated into the rectum.

Under anesthesia the finger was passed into the rectum, where at a distance of about three inches from the anus a circular opening was encountered in the anterior rectal wall through which the tumor protruded. The finger was pushed through the circular opening into the rectovaginal septum and the balance of the tumor easily enucleated. The cavity in the rectovaginal septum was drained with rubber tubing, the extremity of the tubing extending beyond the anus.

The patient was finally discharged cured May 23.

The interesting points in this case were: that the tumor evidently grew with great rapidity in the last three months of pregnancy, that the uterus was not amputated notwithstanding the rupture of the amniotic sac, and the initial onset of labor three days previously, and finally the ulceration of the tumor into the rectum.

133 WEST ONE HUNDRED AND TWENTY-SECOND STREET.

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY.

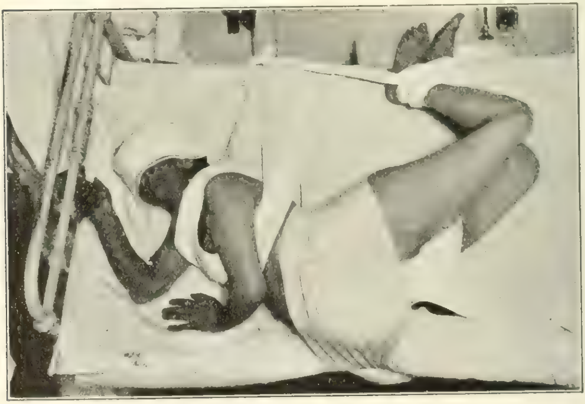
Meeting of April 23, 1909.

The President, HENRY F. LEWIS, M. D., *in the Chair.*

DR. L. E. FRANKENTHAL described

A SIMPLE OBSTETRICAL DEVICE.

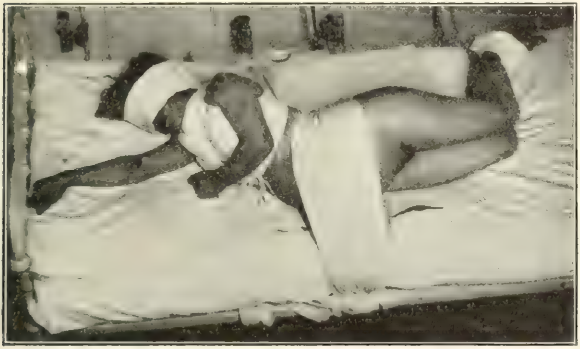
Considering the great sacrifice to the integrity of the soft parts of the mother and the often either fatal or permanent injuries to the child in the application of the forceps on the unengaged head in contractions of the mother's pelvis of lesser degree, the Walcher's position has been a great boon to both mother and child. The value of the position depends upon a hyperflexion of the anterior part of the pelvic inlet upon the sacroiliac joints, increasing the pelvic inlet from 1.5–2.5 cm. The Walcher's position is no doubt painful, especially if the bag of waters has not ruptured, it necessitates the administration of chloroform or morphia or both, it requires the constant attendance of one or more nurses, and in hospitals a special bed or chair. I therefore, about five years ago, decided to construct a harness (first out of bed sheets) which would embody all the advantages and



Correct position.

many more with none of the disadvantages of the Walcher's position in the dorsal decubitus with hanging legs.

The patient is placed on her side—that side which contains the part that is to rotate to the front and advance—and then the harness is attached. The pelvic bandage had better be applied first and tied in front, then the chest and shoulder bandage next, tied behind, the shoulders and the ilium being on a line with one another and parallel to the long axis of the bed. Then finally the foot bandages are applied and tied behind, the thighs being brought at an obtuse angle to the pelvis. This angle can be considerably increased after the patient has been in the position for some little time by gently pushing the knees backward, especially is this true if the liquor amnii has escaped since originally applying the harness. The position is not painful, a nurse is not required any more than in any obstetrical case, nor is chloroform or morphia, on account of the position *per se* indicated. Patients do not beg to be released, though three hours is the longest time I have been compelled to keep a patient in the position. Bodily warmth can better be maintained. The soft parts, on account of the approach of the lower sacrum and coccyx to the ilium, are as much relaxed, if not more so, than in the Walcher's position. There is no edema of the soft parts nor the feet on account of the position; a condition I have frequently observed in the Walcher's position. The impression on the patient and relatives is not so barbarous, a consideration by no means to be overlooked. The accompanying photographs will better illustrate, than I can describe how the harness should be applied. This bandage has been used for many years on many cases at the Michael Reese Maternity and in my own private



Incorrect position.

work and that of Dr. Frank Cary, and has been of immense value.

DR. ALFRED D. KOHN read (by invitation) a paper entitled

CONSTIPATION IN WOMEN.*

DISCUSSION.

DR. GEORGE SCHMAUCH.—I agree with many of the statements made, particularly the quotation that 80 or 90 per cent. of female trouble is due to constipation. Text-books on gynecology say very little about the treatment of chronic constipation. The doctor referred to one symptom which we meet often in examining women, namely, that the rectum is full of feces, but on inquiry we are informed that the patient had a bowel movement every day. The bowels of such patients move, but not farther than in the atonic rectum. Parametritis posterior, catarrh of the tubes, etc., are often caused by chronic constipation. I have found that the most frequent cause of constipation is atony of the rectum. I have not seen much good come from electrical treatment. I use mostly injections of sweel oil to be retained, and in most cases this treatment is successful. Some patients never seem to empty the rectum completely, and in such cases I wash out the rectum after the bowels have moved. For the first weeks I might use lukewarm lavage, and later cold water, which I find to be one of the best tonics for combating atony of the rectum.

A very serious symptom frequently seen in constipation is palpitation of the heart and also a slight edema of the feet and ankles, but all these things are easily remedied by proper treatment of the constipation.

I am also in favor of examining all these cases with the rectoscope. The instrument is so made as to show all the details high up, as far as the sigmoid flexure. This gives one a very beautiful picture of the pathologic conditions in the rectum.

DR. HENRY F. LEWIS.—This question brings up the matter of normal defecation, which is really very complicated. Dr. Kohn referred to the nervous element in constipation, and I wish that he had said more about the physiology of defecation. Many patients come to us with apparent pelvic disease or with actual pelvic lesions, where the real trouble is due to constipation and not to any pathology in the pelvic organs. The very fact of the existence of a stimulus which brings on defecation is rather obscure. This stimulus is not the presence of feces in the rectum, because very often the bowel fails to evacuate itself even when it is full of feces. Indeed, feces normally remain in the lower rectum for hours. Perhaps the stimulus of taking food into the stomach and having it passed on into the bowel may furnish the necessary excitement.

DR. KOHN (closing the discussion).—I do not wish to discuss the nervous mechanism of the bowel because I covered that question thoroughly in a recent paper (*Ch. Medical Recorder*, Oct., 1908). There is one point, however, which I omitted to mention and that is the matter of habit in defecation. It is undoubtedly true that many cases of constipation result from a neglect to form a habit. It is not uncommon to see cases of constipation in persons who previously have been regular in the matter of evacuating the bowel, but owing to some illness which confines them to bed, or a journey, have gotten out of the habit of defecating at a certain time. However, this differs in different individuals. I recall one young man, a perfectly healthy individual, who had a bowel movement every morning at eight o'clock. He went to Europe on a slow steamer, spending most of his time in the smoking-room, eating, smoking, and drinking. He did not have a bowel movement for ten days, the time he was on the steamer and yet felt no ill-effects. Some people have a regular bowel movement only once or twice a week, and yet are perfectly healthy. It is entirely a question of the individual.

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* For original article., see page 213.

As regards the treatment of so-called spastic constipation, we might take up von Noorden's method. He considers all kinds of constipation as being on a common basis, and his treatment consists in giving very coarse foods. He claims that all his cases get well, but that has not been my own experience. This, the spastic variety of constipation, requires entirely different treatment from the atonic kind. It is found usually in very neurotic individuals, and it is analogous in some ways to lead poisoning in that the bowels are tightly contracted. These patients do best under the administration of belladonna and opium, although some require warm baths and rest cures in addition.

Dr. Emil Ries read a paper entitled

MECHANISM OF OCCLUSION OF THE FALLOPIAN TUBES.*

DISCUSSION.

Dr. T. J. Watkins.—I have been extremely interested in this paper, because I have for a long time studied the condition macroscopically. There are two or three things that suggest themselves: first, whether we ever get an occlusion primarily, or whether it is always secondary to an occlusion of the fimbriæ after they become glued to the adjacent peritoneum. In the acute cases one always finds the tube occluded by being glued to the adjacent tissues, and it would seem probable that the cellular infiltration and cell proliferation which occurs might play an important part in the mechanism of occlusion. Another point is that the fimbriæ contain very little tissue, and after they become glued to the adjacent structures and are thoroughly infiltrated with round cells, the amount of tissue remaining must be very small when the process goes on to the extent of shutting off the blood-vessels in the fimbriæ. Another rather interesting condition seen in the clinical study of these cases is that annular occlusion occurs more often in mild than in severe cases. Hydrosalpinx, for instance, is the result of an infection of the tube, and there is often present a scar-like mark at the outer side of the fimbriæ, and occlusion occurs by annular constriction. I would like to have Dr. Ries tell us whether he thinks that the method of occlusion has any relation to the severity of the infection.

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* For original article see page 201.

DR. GUSTAV KOLISCHER.—The explanation Dr. Ries gave of the occlusion of the tube and of the attachment of the peritoneal side of the fimbriæ to the inside of the tube is very plausible, but I would like to ask whether inversion or intussusception of the fimbriæ is absolutely necessary to produce occlusion. The tube might be occluded by infection, causing denudation and a growing together of the raw surfaces. I would like to ask this question, for the reason that in a specimen of extrauterine pregnancy shown in Schauta's clinic, where infection occurred, the fimbriæ were found to be attached to the inside of the sac formed mostly of coagulated blood. The tube was occluded, although the fimbriæ were everted.

DR. L. E. FRANKENTHAL.—One of the practical points to be drawn from the paper and one I have practised for a long time is the following: In operating upon a pyosalpinx, whenever for some reason, I wish to save the uterus, I separate as many adhesions as I dare and then dissect out the uterine end of the tube and ligate off the top of the broad ligament, then as a last step I remove the fimbriated extremity of the tube after having loosened the fimbriated end of the tube from its adhesions, because in my own experience, the cases in which I get the most leakage are those where I used to go down into the culdesac and separate the tube first at the fimbriated extremity. I have extirpated a large number of tubes where the tube was patulous after the adhesions were separated and where the tube proper, including the fimbriæ, was not injured; where, therefore, the escape of pus occurred through the patulous fimbriated extremity.

DR. RIES (closing the discussion).—This paper is only a part of what might be said on the subject. No reference was made, for instance, to hematosalpinx. I have not gone into the theories of Nagel and others as to the inflammatory origin of tubal occlusion in occlusion of the vagina, nor have I considered the occlusion of the tube in tubal pregnancy. In answer to Dr. Watkins' question, I would like to say that of course a great many combinations are possible in the attachment of an inflamed tube to surrounding organs, and also that by the time we operate the primary attachments which lead to occlusion of the tube may have yielded to such an extent that only traces of the original attachments are found. The tube can become adherent and free itself. The peritoneal adhesions are so incalculable in their course that it would be presuming on our knowledge of natural processes to lay down any hard and fast rules. I think I shall have to be satisfied by saying that this is one way of explaining it.

I have not gone into the description of cases with more violent infections than I have had to deal with, such as pyosalpinx with enormously thickened walls, or tuboovarian cysts with the fimbriæ turned outward away from the tube. I should like to make the main purpose of my paper a suggestion that you look at the tubes you remove and find the specimens that do not agree with this theory, and I would also like to have shown me a specimen which on section allows me to demonstrate what I have not actually seen, but constructed and diagrammatically represented in Fig. 8 accompanying my paper.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Meeting of January 28, 1909.

J. O. POLAK, M. D., *in the Chair.*

DR. ABRAM BROTHERS presented a

LARGE MULTILOCULAR OVARIAN CYST AND A SUBMUCOUS SESSILE FIBROID TUMOR SHOWING MARKED CIRCULATORY DISTURBANCES.

On January 15, 1909, a middle-aged woman was referred to his service at the Beth Israel Hospital. She complained particularly of uterine hemorrhage. She presented a large abdominal tumor on the right side intimately associated with a distinctly enlarged uterus. Per vaginam a gaping cervix admitted the index finger which recognized a submucous sessile tumor which bled on being touched. A diagnosis of multiple fibroids was made and hysterectomy was projected for the following day. After the abdomen was opened a large, round, multilocular cyst was seen and an enlarged uterus showing fibroid nodules on its surface. Both were removed, including the left and right Fallopian tubes. The left normal ovary was left to prevent a too sudden onset of the menopause. The ovarian tumor presented nothing unusual. The uterus, when split open, showed on its wall a sessile submucous fibroid tumor the size of the closed fist. The mucous covering of this tumor was intensely congested, suggesting a beginning sloughing process of the tumor. The microscopical examination confirmed the diagnosis. While the body of the tumor showed no structural change, the capsule and mucous covering were so intensely congested that it was apparently only a question of a short time when ulceration or sloughing would have ensued.

There were two points of interest in this case. First, had this patient been subjected to curettage to control the bleedings, it seemed to him this process would have expedited the sloughing and jeopardized the life of the woman. Second, why should a sessile submucous tumor have produced such extensive circulatory disturbances as to threaten sloughing or gangrene?

Dr. Henry Dawson Furniss presented

A SIMPLE METHOD OF DETECTING INJURIES OF THE URETER DURING OPERATION.

The surest method was, of course, to make the ureters more easily recognized by passing into their lumen a catheter or bougie; but many times this was impracticable, both on account of the conditions presented by the patient, or lack of experience on the part of the operator. The ureter might be cut, the cut portion inspected, and then there might be doubt as to its identity. A simple idea was to give these patients methylene blue, three doses of one grain each in the twenty-four hours preceding operation, or to inject into the gluteal muscles twenty minims of a 4 per cent. aqueous solution of indigo-carmine just before the anesthetic was started or after the patient had lost consciousness. Should the ureter be cut, the colored urine would quickly stain the intraabdominal gauze pads, and give warning that the ureter had been injured. If the ureter was cut on the distal side of a clamp or ligature, he believed there would be enough coloring of its lumen to show.

Dr. Abram Brothers said that the suggestion offered by Dr. Furniss was very ingenious. Of course there was nothing new in the idea of giving drugs where one suspected that the ureter had been injured; the drugs were given by the mouth and afterward an examination by cystoscope was made; the colored urine would be seen coming from the normal ureter, while it would be absent from the injured one. Dr. Furniss had improved upon this method. However, an injury to the ureter was rather infrequent, and he believed the danger of injuring it in operations had been exaggerated. In his operative work covering a period of about fourteen years, he had injured the ureter but three times, twice when doing abdominal work, and once when doing vaginal work. He lost two of these cases. In one the patient would have died whether the ureter had been cut or not. The second case Dr. Furniss had assisted him in; he did an hysterectomy for a fibroid uterus associated with such an alarming hemorrhage that clamps had to be used. In tying under the clamps, the ureter was caught. Ureteral catheters were passed on both sides. On the left side the catheter passed readily to the kidney; but on the right side the catheter went a distance of about one and a half inches and went no further. This patient was far advanced with diabetes and succumbed on the table. If this patient had been in better physical condition she might have been saved.

Dr. Herman L. Collyer thought the method of Dr. Furniss was valuable, especially in cases with large fibroid tumors where the ureters were likely to be distorted. Discolored fluid did assist largely in detecting injured parts.

DR. FURNISS said the first autopsy he ever did in New York showed both ureters ligated with catgut. If this patient had lived one day longer, he believed the obstruction in the ureters would have been overcome because the sutures were softening and were just about to give way.

DR. JOHN VAN DOREN YOUNG read a paper on

SACRAL SUSPENSION OF THE UTERUS.

In an article read before the New York Obstetrical Society in May, 1903, and published in the *New York Medical Record*, October 24 of the same year, he called attention to the importance of the uterosacral ligaments in the support of the uterus. Experience since that time had served to strengthen his opinion as to their value as factors in the general scheme of uterine support. Analyzing the action of the various ligaments which attached the uterus to the bony pelvis, he briefly summarized as follows: The broad ligaments on either side prevented lateral displacement and aided in uterine support. He believed that the broad ligaments were only secondarily supportive in their action in the erect position. The round ligaments acted as guy ropes to the fundus when the bladder was filled, when the patient was in a recumbent position and also in the early months of pregnancy. They could not be considered from their normal course or position as at all supportive in the upright position. When the uterosacral ligaments were taken into consideration their function, when the body was in the upright position, was particularly supportive. It was his opinion that any operation looking to the relief of retroversion, retroflexion or either of these combined with prolapse, would fall short of giving the desired relief unless the elasticity and strength of the uterosacral ligaments were taken into consideration.

He also believed that the reason that almost every anterior operation, that was, every operation on the fundus by fixation or suspension or some form of round ligament operation or broad ligament operation, had had its strong supporters, was the fact that in a large percentage of these cases the uterosacral ligaments were not stretched beyond their elastic limit and, therefore, the operation which held the fundus forward would relieve the condition. Where, however, these ligaments were stretched beyond their elastic limit, any operation which held the fundus forward alone would fail. In following out any method of treatment for the relief of retroversion with prolapse, all indicated surgical procedures such as curettage, repair of the cervix, perineorrhaphy, anterior colporrhaphy and removal of hemorrhoids, must be performed as adjuncts to the operation prior to any intra-abdominal work. When the abdomen was opened it was first wise to investigate the condition of the tubes and ovaries, and to do whatever work was necessary to these organs and at the same time break up all adhesions which bind the omentum, gut or adnexa to the uterine body. The patient was then raised to the extreme Trendelenburg position, the gut was taken out of the pelvis, and held above the brim of the true pelvis by pads soaked in normal saline solution. With the contents of the pelvis brought fully into view, the fundus was grasped by a double tooth vulsellum and held well under the symphysis so as to rotate the uterus on its mid-transverse axis, thereby lifting the lower segment. One uterosacral ligament should be grasped in its mid-portion by a long abdominal sponge-holder and drawn well into view, and the amount of shortening determined. A stitch was then introduced through the uterine wall at the point of junction of the ligament, this stitch giving the point of traction. Care should be taken to make this stitch embody enough tissue to allow it to be drawn firmly without fear of tearing. The ligament should be grasped between the fingers and thumb and if the ureter was felt between the folds, it should be pushed aside laterally to avoid being included in the stitch. Having identified the ligament and located the ureter, the next step was the determination of the point at which the ligament should be sewn to the uterine body. To do this, the sponge-holder should be drawn downward, inward and forward, thereby putting on tension the outer or upper section of the ligament; then, by drawing upon the stitch already in place, a point was readily determined at which the tension of the ligament would meet the requirement. The point was held by the sponge-holder and the stitch already in place was passed through the ligament, to include all three layers of the ligament near its insertion, and both layers of the folded end. This brought the fold of the ligament on the inner side of the uterine insertion. The middle of that portion of the ligament was grasped between its origin and the stitch above described by a long thin jawed clamp. This was placed on the stretch by moving the point of the clamp backward, upward and slightly outward. The three folds of the ligament would then be clearly seen. The reduplicated fold should be outward to the shortened ligament. A stitch was then placed, running through the three layers, beginning at the outer, through the middle and then the inner fold, at the point farthest from the uterine body. The same procedure was gone through with by a center stitch, midway between one at the junction of the uterine end and the stitch nearest the sacrum. In placing these stitches too great importance could not be laid upon the necessity of including all three of the folds of the ligament. A sharp knife was then taken and the peritoneum covering the three folds was scarified. The next step was the taking of a fine catgut suture on a small needle and overhanding these three layers from end to end of the reduplication. The procedure was followed on the opposite side and the operation was then completed. This operation was contraindicated in very stout people on account of the difficulty of its performance and where there was retroflexion of the body of the uterus with little or no prolapse. It was of particular value in retroversion with prolapse and cystocele. Dr. Young closed his paper by reporting eight cases. The points of advantage in the operation were as follows: The supporting of the uterus in its normal position from the bony structure above; the body and especially the fundus were freely movable for all the functions of the body; it did not distort but reproduced the curve of Carus. In the event of pregnancy, there was no possibility of dystocia.

DISCUSSION.

DR. A. STURMDORF said that judged from a purely technical standpoint, Dr. Young's procedure for securing uterine dorsosuspension by pleating the sacrouterine folds intraabdominally must accomplish that object, if nothing else. Omitting all technical discussion on the method as such, he asked that they direct their attention to the vital question that must obtrude itself in the consideration of this as of any operation proposed for the correction of uterine retrodisplacement, namely, would this operation restore not only the anatomical direction of the uterus but also the normal physiological poise and mobility essential to the functions of that organ?

Dr. Young's theoretical contentions for attacking the uterosacral folds were based upon his observations that "the sacral attachments of these folds suspend the uterus from the highest point of the pelvis and that these same folds are usually redundant and lax in retroversions."

As for the first contention, it seems difficult from a mechanical point of view to concede greater importance to the suspension of the cervix by the sacrouterine folds from the highest point than to the retention of the fundus by the round ligaments at the lowest point.

As for the second contention, namely, the laxity or redundancy of the uterosacral folds, one could not escape the suspicion that Dr. Young's method attacked a result rather than the cause of the trouble; for it was an easily demonstrated fact that the sacrouterine folds were ligaments in name only and not in function. They were in reality only peritoneal folds whose elastic and muscular elements had at the most only a microscopic existence; furthermore, they represented the weakest and most variable structural attachments of the uterus, as observed in their daily routine where they were the first to yield to the pull of the vulsellum.

Uterine displacement represented *abnormal* uterine support and any corrective procedure must be based upon a clear conception of the mechanism of its *normal* support of which the uterosacral folds presented only a single passive factor.

The discussions on normal uterine support had not attained finality or precision to the present time.

In his paper on "Perineum, Perineorrhaphy and Prolapse," read before the Medical Association of the Greater City of New York, and published in the *Medical Record*, April 1, 1905, he attempted to elucidate present conceptions on this subject, and it must suffice for this discussion to emphasize that all muscular and ligamentous uterine attachments, and especially those constituting the pelvic floor, served to support the uterus—*not* by virtue of their *textural resistance* to displacements, but by acting as *movable* and contractile *planes* that deflected the displacing force of intraabdominal pressure.

Paradoxical as it might appear, both the maintenance and disturbance of uterine equilibrium were the result of the same intraabdominal pressure under the influence of balanced or unbalanced deflection.

As a single illustration, the deflection might be misdirected by a change in the contours of the pelvic floor, acquired, congenital, or by the abnormal skeletal planes presented by the so-called "Glenard habitus" with its resulting general splanchnoptosis.

To attempt the correction of a uterine deviation resulting from such a cause by pleating the uterosacral folds would not reflect credit on the method, and it followed that, in a given case, the etiological factors and their resultants must indicate the particular line of correction to be followed. No one method could possibly be applicable to all causes and cases.

Their armamentarium for the cure of retrodisplacements must include orthopedic, mechanical, surgical and medical means, any or all the operations proposed might find their sphere of usefulness, when they had reached a clear correct conception of normal uterine support and base their corrective procedures on such knowledge.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Treatment of Vesicovaginal Fistula by the Operation of Bracquehaye.—A. Brindeau (*L'Obstétrique*, March, 1909) says vesicovaginal fistulæ are becoming more and more rare, owing to greater obstetrical skill. There are three methods of operation: the American of freshening, the French of "dédoublement" which has the advantage of not destroying any tissue and thus not increasing the size of the fistula, and that of reaching the fistula from above after laparotomy. Bracquehaye instituted a mixed operation which is successful even in very large fistulæ. He makes the fistula easily accessible, and slowly dilates the genital canal. Asepsis of the bladder is assured by the use of urotropin and lavage with permanganate of potash or nitrate of silver. A circular incision is made around the fistula, through the entire depth of the vaginal mucosa. Care must be taken not to tear the ring of mucous membrane. A collar of mucosa is thus formed around the fistula. This collar of membrane is turned in so that it replaces that of the bladder and is sutured together so as to close the orifice. The denuded surface is now sutured in a straight line so as to close over the fistular orifice. An immediate cure is generally the result. The author details eleven cases successfully operated on by this method.

Injection of Broad Ligaments with Quinine for Prolapsus Uteri.—J. I. Parsons (*Practitioner*, March, 1909) favors the treatment of prolapse of the uterus by means of injections of quinine into the broad ligaments, the object being to irritate the cellular tissue so as to produce, an effusion of lymph and subsequently new connective tissue. The injection is made on each side of the uterus through the vaginal wall at a distance of three-quarters of an inch from the cervix, and a little below the level of the external os. The needle is one inch long. If the cervix is much enlarged, the point of injection will be nearer to the cervix. The aim of the operator should be to insert the needle exactly halfway between the position of normal cervix and the pelvic wall. When operating on cases of chronic procidentia, it is advisable to inject somewhat lower on account of the tendency of the bladder to pouch down on each side of the cervix. After the injections are made, the operator proceeds to antevert the uterus as much as possible. A cup-and-stem india-rubber vaginal pessary is then inserted, and secured by tapes to a band round the waist. It may be removed in three days. The patient lies on her face or side as much as possible, in order to throw the uterus forward. For cases of chronic procidentia, it may be necessary to do more than one injection. An interval of at least fourteen days should elapse before the second injection. The quantity injected should also be less by one-third, because the patients react more. For a case of prolapse in the first stage, a week to ten days in bed may be sufficient, followed by another ten days on the sofa. If a ring pessary is then inserted in order to take the weight of the uterus, the patient can go about the house and out for drives, but must still avoid anything that throws much strain on the uterus, such as lifting weights, etc. At the end of three months, the ligaments are usually strong enough to do without the ring, but the full strength of the new fibrous tissue is not reached under six months. If the perineum is torn it should also be repaired. It is claimed that the operation recommended is simple, rapid, safe, effective and causes no pain.

Nervous Disorders Simulating Pelvic Disease.—C. T. Dercum (*Jour. Amer. Med. Assn.*, Mar. 13, 1909) analyzes 412 gynecological cases with reference to the occurrence of hysterical or neurasthenic symptoms, and holds that there is no relation between hysterical stigmata and pelvic disease; this is likewise true of the symptoms of neurasthenia. That hysteria and neurasthenia can coexist with pelvic disease goes without saying, just as they may coexist with a brain tumor or a broken leg. The statistics given do not even show that neurasthenia or hysteria exist as frequently in pelvic diseases as in other visceral affections. The facts cited prove that operations on the pelvic and other viscera for the relief of nervous symptoms have no justification. No operation should be performed which has no positive surgical indications. When this subject is fully understood the fastening up of so-called loose kidneys, the removal of normal ovaries and tubes, of normal uteri, of normal appendices, of pieces of normal coccygeal bone, will cease, as will also repair of trivial cervical lacerations.

Primary Ovarian Actinomycosis.—Actinomycosis is one of the rarer forms of infection of the human tissues, while actinomycosis of the ovary constitutes one of the curiosities of gynecology, only six cases of this condition being on record. In none of these has the ovary been the primary seat of infection but has been infected by extension of the disease originating either in the intestines or in the vagina, uterus, and Fallopian tubes. In the case recorded by F. E. Taylor and W. E. Fisher (*Lancet*, Mar. 13, 1909), the ovary was the primary seat of the disease. Four years before admission, the patient being then 30 years of age, abdominal pain was first noticed. It was felt in the right hypogastrium, being very severe and throbbing in character, and was aggravated by the recumbent posture and relieved by walking. About this time she also began to sweat profusely at nights and this continued until admission. Diagnoses were made of uterine displacement and suppurating ovarian cyst. Operation for removal of the growth was followed by a persistent sinus. As there was no evidence of actinomycosis of adjacent structures, the organism must have reached the ovary by way of the blood stream, possibly primarily through the tonsil.

Primary Carcinoma of the Fallopian Tube.—C. C. Norris (*Surg., Gyn., Obst.*, March, 1909) records an instance of this rare condition occurring in a woman of twenty-seven. He says that carcinoma of the tube is one hundred times as rare as carcinoma of the fundus of the uterus. It is usually unilateral. About once in every four or five cases it will be found bilateral. Histologically, cancer of the tube may be either papillary or alveolar. The papillary is the more frequent. Inflammation usually precedes the cancer. The condition may occur as a degeneration of a benign papilloma, but is usually primarily malignant. The tumor is of rapid growth and gives early metastasis. The symptoms are watery, blood-stained leukorrhea, and atypical hemorrhage, usually occurring between forty or fifty years of age. The symptoms are often masked by those of a preexisting pelvic inflammatory disease. The pelvic examination usually reveals a condition simulating pelvic inflammatory disease. When operating on patients for pelvic inflammatory disease who are at the cancer age, the tube should be opened before the abdomen is closed and if a papilloma is found, a radical operation should be performed. A tube, the seat of a cancer, usually resembles a hydrosalpinx until the contents are examined.

Diagnosis of Ovarian Dermoid Cysts.—J. C. MacEvitt (*N. Y. State Jour. Med.*, April, 1909) has attempted to formulate the differential diagnosis of dermoid cyst of the ovary. He concludes that, with the additional symptoms which he has been able to record: 1, occasional very rapid development; 2, vomiting after the onset of pain; 3, aggravation of pain in the tumor for a few days prior to the menstrual epoch; 4, unreliability of Kuster's sign—position of the tumor anterior to uterus; 5, irregularity of outline; 6, abdominal free fluid, the diagnosis of ovarian dermoids can never be positive—at the most it is inferential.

Thymus and Ovaries.—Francesco Valtorta (*Ann. di Ostet. e Gin.*, Jan., 1909) has studied the relations of the thymus and the ovaries in animals, the rabbit being the one chosen for experiment. He finds that when the thymus is removed from young animals the operation produces a marked effect on the nutrition of the animal and on the development of the ovaries. Removal of the ovaries has no effect on the thymus. Grafting the thymus on the animal does not affect favorably the ovaries. Injection of extract of thymus retards the lesions of the ovaries in animals from which the thymus has been removed. Injections of ovarian extract do not affect the thymus. Removal of thymus from young animals has more effect than removal of the ovaries. The action of thymus extract on the circulation is due to the nucleo-isotonics found in the prepared juice. In the human body the thymus reacts to disease by hypertrophy of the organ, and the structure of the ovaries is profoundly altered, as occurs in animals. Hypertrophy of the thymus coincides with hypertrophy of the lymphatic glands.

Ovarian Opotherapy.—Paul Dalché (*La Gyn.*, March, 1909) defines opotherapy as the treatment of conditions in which there is irregularily or deficiency of any secretion by the use of the juice of the secreting gland. Ovarian dystrophy includes insufficiency and hypofunction of the ovary, total or relative, and incomplete. There may also be hyperactivity or a lack of equilibrium. Hyperactivity of one glandular organ may coincide with impaired function of another. The important elements in the ovarian tissue are the corpus luteum and the interstitial cells. The belief in an internal secretion of the ovary is based upon menstruation, puberty, and the menopause with their accompanying changes, study of the changes in castrated females, and examination of animals before and after castration. The conclusion from these researches is that the ovarian secretion causes congestion of the uterine and ovarian vessels, and has some connection with menstruation; it causes increase in the amount of urine and of urea excreted, and of the total elimination of nitrogen and phosphates. Ovarian medication is employed in the form of powdered ovaries, called ovarine, in doses of 0.2 gram twice daily; peptonized ovaries, which are more assimilable, used in a powder; glycerinated extract of ovaries, dose 1.5 grams per day; and powder of the corpus luteum in doses of 0.8 gram. The treatment must be continued for a long time in order to get good effects. The indications for this form of treatment are ovarian dystrophy, shown by heat flashes, sweating, headache, insomnia, and similar symptoms, anemia, increase of adipose tissue, etc. Insufficiency may be congenital, of puberty, of the menopause, nervous, congestive, or nutritive. Other indications are hyperactivity of the ovaries, ovarian insufficiency with irregularity of menstruation; cephalalgia of puberty; surgical menopause; various nervous conditions; polyglandular syndromes, including variations in function of the suprarenals, and thyroids; genital accidents, including metrorrhagia, amenorrhea, dysmenorrhea, and arrest of ovarian development; sometimes chlorosis and anemia; simple and exophthalmic goitre; obesity; chronic rheumatism occurring after the menopause; some forms of psychoses, and, lastly, surgical menopause.

Mammary Opotherapy in Gynecology.—Batuaud (*Jour. de Méd. de Paris*, April 13, 1909) advocates the use of the dried mammary gland in various kinds of hemorrhage. It is indicated in menorrhagia of puberty, in ovarian congestion combined with hemorrhage in young women, in the menorrhagia of salpingo-oophoritis, in fibroid tumors of the menopause, in hemorrhage of uterine sclerosis at the menopause, and in other menopause hemorrhages. It is useless in hemorrhage from malignant growths, in placental retention, and with mucous or fibrous polypi. Its effect is to bring back the normal rhythm of menstruation as to amount, frequency, and duration. In general, it is indicated wherever we have exaggerated menstruation, prolonged menstruation, or hemorrhage between the normal periods. The dose is two powders of 50 grams per day, or twice as much at the period of irregular hemorrhage.

Use of Colloidal Silver in Puerperal Infection.—Theuveny (*Bull. Gén. de Thérap.*, April 30, 1909) has made use of colloidal silver at the Beaujon Maternity Hospital in forty-two cases that became infected after labor or abortion. These salts were used both locally and by intravenous injection. The author concludes that metallic silver ferments may be employed with advantage in all cases of puerperal infection. They are especially useful in cases of medium gravity, in which they render a service that is second to no other remedy. The most useful method of administration is intravenous injection, in doses varying from five to fifty centigrams, and it is without any inconveniences. Application of colloidal silver on tampons after curetting is followed by lowering of the temperature and improvement in general condition, but this may also occur with simple curetting and injections of sterile water. Frictions and intra-uterine injections of collargol are somewhat unsatisfactory when used without any intravenous injection. If curetting has not been followed after a few days by improvement, the intravenous injections are to be used, and they can be repeated as often as necessary without any inconveniences.

Placenta Prævia.—U. B. Mason and J. T. Williams (*Bost. Med. Surg. Jour.*, June 3, 1909) present an analysis of 155 cases of placenta prævia at the Boston Lying-In Hospital. They conclude that improvement in the results of the treatment of placenta prævia is to be expected not so much from any particular *method* of delivery as from *early* delivery. The advantages of early delivery are as great for the child as for the mother. Every patient should be instructed and enabled to notify a competent obstetrician at once of any uterine hemorrhage during pregnancy, as any hemorrhage during the second half of pregnancy demands an immediate investigation of the contents of the lower uterine segment. A routine vaginal examination should be made on every patient at the end of the seventh month. In multiparæ, rapid dilatation, followed by version and extraction, offers a safe and satisfactory method for both mother and child. In primiparæ, at the beginning of hemorrhage, while still in good condition, Cesarean section should be the operation of choice.

Rupture of the Uterus.—The treatment of his accident recommended by T. W. Eden (*Jour. Obst. Gyn. Brit. Emp.*, June, 1909) is as follows: Incomplete rupture of moderate severity, involving only the lower half of the broad ligament, may be treated expectantly by drainage or packing. Abdominal section for exploration of the injury and arrest of hemorrhage will, as a rule, be required. According to circumstances this may be followed (*a*) by packing and drainage; (*b*) by subtotal hysterectomy. In most cases of extensive rupture, whether complete or incomplete, removal of the uterus is required. In the less serious cases of extensive rupture not attended by serious bleeding, vaginal hysterectomy may be performed, but this operation has been practised in comparatively few cases. Suture of the rent is not to be recommended excepting in the case of small lacerations unaccompanied by continued bleeding, and accessible in position if the aseptic management of the labor can be relied upon.

Method of Breech Extraction.—G. Rossier (*Ann. de Gyn. et d'Obst.*, May, 1909) says that for an easy delivery in breech presentations the infant must traverse the pelvis in the natural attitude with the arms folded on the chest, and rotation must take place forward. Hence there should be no traction on the breech or lower extremities before the umbilicus has reached the vulva. The method described by the writer consists in using traction on the body of the child and favoring rotation of the trunk through the three diameters of the entrance, of the cavity, and of the exit of the basin. Unfolding of the arms may interfere with rotation and favor extension of the head. The accoucheur places his thumbs parallel with each other on the posterior surface of the buttocks passes upward not further than the sacrum of the infant, while the fingers are placed on the thighs.

An excellent hold is obtained, allowing of the use of much tractive force. The child is forcibly drawn downward with traction in the axis of the trunk, which brings the shoulders under the symphysis, drawing the body to the side of the abdomen. The anterior shoulder is supported on the symphysis, the posterior one disengaging itself over the fourchette. It is sometimes necessary to exercise alternate tractions below and above to disengage the shoulders. The birth is facilitated by drawing with one hand on the trunk while the other placed like a fork about the neck directs the head in the desired direction. This method is simple and rapid. No internal maneuvers are necessary and danger of infection is minimized. The quickness and brief danger to the child make absolute asepsis unnecessary. Maternal and fetal lesions are much less frequent than with other methods.

GYNECOLOGY AND ABDOMINAL SURGERY.

Retroversions of the Uterus.—H. E. Hayd (*Buff. Med. Jour.*, March, 1909) emphasizes the fact that not every case of retrodisplaced uterus in the young or unmarried or married woman requires treatment. If they produce a definite symptomatology, the Alexander operation should be employed, if the case be an operable one; that is, if the uterus is freely movable and the tubes and ovaries are healthy. Retroversions and retroflexions in the young and unmarried should never be treated by pessaries, but by the Alexander operation. Tampons and pessaries have their place in retrodisplacements in married women or women who have been pregnant, but they accomplish practically nothing in the displacements of young women. The Alexander operation is safe and without mortality incident to the operation, and no harm can come from its proper performance; even if the uterus subsequently falls, the patient is no worse off than she was previous to the operation. It does not in any way interfere with pregnancy and future child-bearing, but on the contrary materially helps the possibility of pregnancy. No pain or distress follows the operation if the case operated upon be properly selected; and if pain and suffering result, there existed at the time of the operation latent tubal and ovarian trouble, which sooner or later perhaps would have required a radical operation. If it becomes necessary to do a celiotomy on a person who previously had an Alexander operation, the uterus will be found in its normal anteflexed position, which is necessary in every case, whether the tubes and ovaries are removed or not, to insure good health and freedom from future suffering. Complicated retroversions must be treated on general surgical principles and preferably by the abdominal route.

Intestinal Localization.—G. H. Monks (*Jour. Amer. Med. Ass'n*, April 3, 1909) reviews the means of intestinal localization. He says that the following features enable the surgeon to determine approximately to what part of the small intestine a given loop belongs. Near its upper portion the bowel is usually thick, of large caliber, very vascular, and it contains large and numerous valvulæ conniventes, which can easily be felt through the walls of the intestine. The attached mesentery—if there is not too much fat in it—exhibits large, long, straight vessels radiating to the intestine from arches (principally primary) deep in the mesentery. Ordinarily the mesentery here is likely to be thin and to show the vessels, and between them translucent, or even transparent, areas close to the intestine. The distinguishing characteristics of a loop of bowel near the lower end of the intestine, and of the mesentery attached to it, may be summarized as follows: The bowel is usually thin, is likely to be of comparatively small caliber, and only moderately vascular; while probably no valvulæ conniventes can be felt through its walls. The attached mesentery has relatively small, short, tortuous vessels, which spring from secondary, or even tertiary loops deep in the mesentery. There is usually more fat in this part of the mesentery than there is in that part opposite a loop near the upper end of the intestine, and, for this reason, the mesentery here is usually thick and opaque and the vessels are obscured or, in very fat mesenteries, entirely hidden. In many cases little tabs of fat can be seen extending from the mesentery a short distance on each side of the bowel. To determine the direction of the bowel in any given loop the latter should be drawn up taut out of the wound by an assistant, keeping its axis parallel with that of the root of the mesentery, while the examiner grasps the loop between the thumb on one side of its mesentery and the first two fingers of the same hand on the other. If no twist is detected in the mesentery the examiner knows that the end of the loop which is uppermost is actually the nearer to the duodenum. If a twist is detected, it is removed by turning the bowel until none can be found. The base of the pelvic or lowest fold of the mesentery is an important landmark in the lower abdomen, and it can usually be palpated from a wound in that part of the abdomen. The great fossa on the left of the abdomen may be reached from a wound in the lower abdomen by carrying the tip of an irrigating nozzle well around the pelvic fold of the mesentery, and then pushing it upward. The lowest coil of the ileum can be picked up at once between the surgeon's thumb and finger by causing them to grasp the base of the pelvic fold of the mesentery and the loop of bowel which is attached to it.

Perforation of the Uterus During Instrumentation.—A. P. Heineck (*Pac. Med. Jour.*, Feb., March, 1909) say that most perforations of this type occur during dilatation of the cervix or curettage of the uterus. He urges that there should be no curettage without general anesthesia, so that movements of the patient may not lead to such an accident, and no curettage without ample cervical dilatation. As regards treatment, he advises that if the uterus is nonseptic, if the perforating instrument is aseptic and if it can also be reasonably assumed that there is an absence of omental or intestinal or important vascular lesions, the treatment to be followed is one of armed expectancy. The patient must be confined to bed and immobilization enjoined for at least three days. The patient's pulse, temperature, facies, and abdomen must be carefully watched. A suppurative cellulitis, signs of internal hemorrhage, etc., call for intervention. A wick of gauze may be inserted into the uterus, but it should not be introduced much beyond the internal os. In all cases in which there has been a prolapse of the omentum, or of intestines into the uterine cavity; in all cases in which associated injuries to the intestines or omentum coexist, or in which there are reasons to fear a significant internal hemorrhage, laparotomy is urgent. Once the abdominal wall has been opened, the visceral lesion must be repaired. The uterine puncture, if small, need not be sutured. If large, if of the nature of a tear, of a laceration, it is better that it be sutured. One or two layers of sutures may be used. Whether small or large, if the perforation be the seat of hemorrhage it should be sutured.

Corpora Lutea, Menstruation, and Rut.—C. Regaoud and G. Dubreuil (*Lyon Méd.*, March, 1909) says that corpora lutea appear in the human ovaries only between puberty and the menopause. The hypothesis that the corpora lutea of the ovary are the secreting glands of these structures, producing the internal secretion, is histologically probable. But these organs are not the cause of the rut in dogs and other female animals, and probably are not the cause of menstruation in the woman.

Functional Relations of the Corpora Lutea with the Nonpregnant Uterus.—C. Regaoud and G. Dubreuil (*Lyon Méd.*, April 11, 1909) also consider the relations of the corpora lutea to the nonpregnant uterus. After experiments on animals they conclude that these observations show that rut is absolutely independent of the presence or absence of corpora lutea, recent or ancient, in the ovaries. In rabbits the uterus has shown no modifications in connection with the rut, and the rut is not generally accompanied by appreciable modifications in the uterus. Involution is not always finished two or three weeks after labor has taken place, especially on the site of the development of the placenta. It is still more slow after abortion with resorption of the ovum. In the absence of rut, copulation, and labor, the living uterus is either flat, soft, pale, and not contractile to air or cylindroid, hard, rosy, and contractile. The gravidic hyperplasia must be distinguished from the pregravid modifications, which consist in changes of form, diameter, and circulation. Vasomotor effects play a large part in these changes. Pregnancy, on the contrary, produces changes in the muscles and mucous membrane of the uterus. If we say that the uterus atrophies when the formation of corpora lutea is suspended long enough, we acknowledge that this atrophy is caused by the absence of the corpora lutea and their secretion;

but this is absolutely inexact. By the use of statistics, as well as by experiment, it has been demonstrated that the corpora lutea have no causative relation to the variations in the uterus nor to the pregravidic modifications. These modifications occur about thirty hours after copulation, and arrive at their maximum development on the third or fourth day. The first modifications after the rupture of the follicle begin thirty-two hours after coitus, and the corpus luteum is in apogee eight or ten days after connection.

Ovarian Transplantation.—Immediately after operation for adherent retroversion of the uterus and removal of the adnexa for double tubo-ovarian disease, G. A. Casalis (*Jour. Obst. Gyn. Brit. Emp.*, May, 1909) transplanted a piece of the fairly sound ovarian tissue to the broad ligament, between its folds and close to the uterus. Two and a half months later menstruation reappeared and has recurred every twenty-four or twenty-six days for four years. During the last year, however, the patient has, at different times, been seized just before the onset of her periods with peculiar attacks of a somewhat alarming character. She generally has a violent headache, followed by an intense pain over one part or other of the abdomen. She then has three or four severe rigors, becomes blue in the face and extremities, almost pulseless, vomits incessantly, and frequently passes one or two offensive motions. Then about four to five hours after, sometimes much sooner, a reaction sets in; she breaks into a heavy perspiration, the face is flushed, the pulse bounding, and the menses almost immediately make their appearance. Contrary to her own statements, the flow is evidently lessening. Bimanual examination shows the transplanted ovary not to have decreased greatly in size, but to have become hard, probably mostly fibrous.

Exophthalmic Goitre in its Relations with the Function of Reproduction in Women.—A. Pinard (*Ann. de Gyn. et d'Obst.*, May, 1909) gives the history of an interesting case of exophthalmic goitre, in which exophthalmos began at puberty and diminished when menstruation was established regularly, and again when the first pregnancy occurred. Three years after, coincident with a period of amenorrhea, the exophthalmic goitre developed, with immediate improvement when the menses returned normally. During a second pregnancy with abortion the condition remained stationary. During the third pregnancy the goiter again decreased and normal labor and lactation improved the condition. The author gives observations of eight other cases, and goes on to consider the apparent relations between pregnancy, the menses, and goitre. The opinion expressed at the end of his review is that the syndrome called exophthalmic goitre has an etiologic relation to ovulation and not with the pregnant or puerperal state. As soon as the harmonious rhythm of the reproductive functions is established, the symptoms are relieved. It would be premature to say that a nervous condition is always present in these persons, and that an internal secretion in relation with the evolution of the species may be the cause of a dyscrasia producing the symptoms of exophthalmic goitre. The autointoxication causing this dyscrasia has its source in the ovarian glands rather than in the thyroids.

Elongation of the Uterine Nerves in Women.—Keiffer (*La Gyn.*, May, 1909) believes that many of the troubles from which women suffer are due to a contraction, or shortening by hardening of the surrounding tissues, of the uterine nerves. In the normal condition all the tissues are perfectly supple, but when the tissues undergo congestion or exudation the nerves are shortened and pain results. The author claims to render the nerves freely movable by means of massage and movements impressed upon the uterus by means of the two hands. At the sides of the uterus we may reach the nerves, vessels, and muscles of the uterus, and may massage them. In case of subinvolution after a few days by this method all the symptoms may be removed. In case of dysmenorrhea with a hard small uterus the treatment renders supple the broad ligaments and uterosacral ligaments, by progressive tractions. Pain in such cases is erroneously attributed to stenosis and dilatation is performed without good results. All kinds of sclerosis except that caused by the gonococcus are relieved by nerve elongation. Adhesions of the tubes are benefited. Results are so rapid as to be almost miraculous. The movements dissociate the agglomerated nervous elements, increase the circulation and nutrition, and free the sensorial corpuscles from their adhesions. The technic is extremely simple. It consists in stretching the ligaments and at the same time exercising a certain amount of traction on them at their insertion into the uterus. The patient is placed in the gynecological position, with bladder and rectum empty and the abdominal walls relaxed. The table should be low. The abdominal hand pushes the uterus down to the vaginal finger, placed against the ligaments, and pushes it to one or the other side forward or backward. The index finger may be in the culdesac of Douglas or at the side of the uterus. The treatment is finished by movements of elevation and depression of the uterus. The different movements may continue from two to five minutes according to the amount of pain produced. Hot douches should be used at the same time, with ovules of glycerin and Brandt massage.

DEPARTMENT OF PEDIATRICS.

REVIEW OF SIXTY CASES OF CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS.

BY

DAVID E. BRODERICK, M. D.,
Professor of Pediatrics Post-Graduate Medical School; Pediatrist to the St. Luke's and Post-Graduate Hospitals, Kansas City, Mo.

In the compilation of this paper no attempt has been made to encompass the entire literature of congenital hypertrophic stenosis of the pylorus in infancy. Isolated case reports of the last two years have not been included. The majority of the cases have been reported by English authorities and most of the original and working hypotheses have been advanced by these physicians, notably Cautley, of London, and John Thompson, of Edinburgh. I heartily indorse the attitude of Pfaundler in insisting on a sharp differentiation between spasm of the pylorus and congenital hyertrophic stenosis, two conditions dissimilar in every way. The early American literature was rendered less convincing by many examples of this confusion. Pfaundler gives the credit to Hirschsprung for priority in "a scientific clinical recognition of pyloric stenosis of infancy (1887), although Williamson of Edinburgh, in 1841 gave an accurate description of a scirrhus of the stomach probably congenital. The next to scientifically elucidate this subject was Dawosky in 1842.

I give below in tabular form a summary of sixty cases that I have found reported. . . . Males predominate 2.5 to 1 (Wachenheim). Cautley gives the sexes as equally affected. I would personally give a greater predominance to males than even that allowed by Wachenheim. One readily gains the impression, by a cursory perusal of the literature, that the etiological factor is not ascertainable at present and many plausible and unique theories have been advanced as explanatory, notably:

TABLE OF REPORTED CASES OF CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS.

Author	Sex and Age	Onset	Symptoms and Findings	Treatment	Result	Postmortem
Burghard	Male, 10 weeks	Vomiting 4 weeks	Visible peristalsis and pylorus palpable.	Operation. Findings typical.	Recovery	
Burghard	Male, 3 months	Vomiting birth	Peristalsis and pyloric tumor. Wt. 6 lb.	Operation. Findings typical.	Recovery	
Burghard	Male, 7 weeks	Vomiting birth	Visible peristalsis and pylorus palpable. Wt. 6½ lb.	Operation. Findings typical.	Recovery	Died 3 months afterward in convulsions.
Voelcker	Male, 2 months	Vomiting 2 weeks	Breast-fed. Wt. 5½. Peristalsis. No pyloric tumor on admission, palpable 5 days later. Continual loss of wt. despite cessation of vomiting.	Lavage	Death diarrhea	Pylorus thickened; hypertrophy of circular fibers. Mucous membrane plicated but not inflamed.
Voelcker	Male, 10 weeks	Vomit 3 weeks	Wt. 5 lb. Peristalsis, tumor. Gastric fluid, mucin, ferment plus, total acidity lowered.	Lavage feeding	Recovery	
Voelcker	Male, 3 months	Vomiting 4 weeks	Breast. Constipation. Peristalsis and tumor. Much mucus. Ferment plus.	Lavage	Death sudden 28 days.	Typical.
Voelcker	Male, 9 weeks	Wasting	Natural motions. Vomiting. Peristalsis and tumor.	Lavage	Death	Death 28 days after admittance, finding typical.
Voelcker	Male, 2 months	Vomiting 2 weeks	Pyloric tumor; peristalsis.	Lavage	Recovery	
Voelcker	Male, 9 weeks	Vomiting 2 weeks	Visible peristalsis. Abdomen distended; pylorus not felt. Wt. 7 lbs. admission.	Lavage	Death	Typical.
Voelcker	Male, 2 weeks	Vomiting 5 days	Wt. at birth 10 lb.; 6 lb. on admission. Peristalsis and tumor. Vomits after feed.	Lavage	Death	Typical. Also dilatation of left renal pelvis.
Sutherland	Male, 6 weeks	Vomiting 7 days	Peristalsis and tumor	Lavage	Recovery	
Sutherland	Male, 3 months	Vomiting 5 weeks	Constipation. Peristalsis and tumor.	Lavage. Attacks of diarrhea occurred under treatment.	Recovery	

TABLE OF REPORTED CASES OF CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS. CONTINUED

Author	Sex and Age	Onset	Symptoms and Findings	Treatment	Result	Postmortem
Carpenter	Female	Wasting	Furred tongue. Wt. 5¾ lb. Peristalsis and pyloric tumor. Stomach below umbilicus.	Operation 3 months.	Death	Typical. Extension for some distance of muscular layer.
Putnam	Male, 3 weeks	Vomiting 2 weeks	Accumulative vomiting. Constipation. Peristalsis.	Medical	Death	Typical.
Meltzer	Female	Vomiting	Constipation. Peristalsis. Vomiting related to food.	Operation	Death	Typical. Prudden said there was dense fibrous tissue in the submucosa; hypertrophy of inner m. layer.
Nicoll	Male		This case was not diagnosed on acct. of "plump and well nourished appearance;" died of exhaustion from vomiting despite the nourishment.		Death	Typical.
Hobhouse	Male		Report of pathological specimen			Typical.
Burghard	Male, 6 weeks	Vomiting 13 days	Peristalsis and pyloric tumor. Emaciation.	Operation. Findings typical.	Recovery	
Burghard	Male, 7 weeks	Vomiting 4 days	Peristalsis and palpable tumor. Lost 18 oz. in 10 days under lavage.	Operation. Findings typical.	Recovery	
Burghard	Male, 14 weeks	Vomiting 4 weeks	Marked dilatation of stomach. Pylorus large and hard.	Operation. Findings typical.	Recovery	
Burghard	Male, 7 weeks	Vomiting 3 days	Wt. at birth 9 lbs. On admission 6 lbs. 4 oz. Peristalsis and pyloric tumor.	Operation. Findings typical.	Recovery	
Burghard	Male	Vomiting birth	Wt. 6 lbs. 8 oz. Peristalsis, etc.	Operation. Findings typical.	Recovery	
Burghard	Male, 8 weeks	Vomiting 2 days	Marked peristalsis and pylorus palpable.	Operation. Findings typical.	Recovery	

Author	Sex and Age	Onset	Symptoms and Findings	Treatment	Result	Postmortem
Williamson	Male	First case Report. Diag. Congenital Scirrhus of Stomach				Typical.
Thompson	Male	Vomiting 10 days	Breast-fed. Wasting. Peristalsis and tumor.		Death	Typical except that a submucous infiltration is described.
Thompson	Male	Vomiting 4 weeks	Breast-fed. Vomiting. Emaciation. No tumor or peristalsis.		Death	Typical.
Thompson	Male	Vomiting 7 days	Same as above		Death	Typical.
Grau	Female	Vomiting 3 months	Vomiting, diarrhea. Peristalsis. No tumor.		Death 5 months	Atypical findings.
Grau	Female	Vomiting 2 months	Vomiting. Rapid emaciation. Visible peristalsis. Constipation.			Typical.
Finkelstein	Female		Tumor near umbilicus. Vomiting. Peristalsis.		Death 4 months	Typical.
Grau	Male	Vomiting 3 weeks	Peristalsis, vomiting and wasting		Death	Typical.
Kogs	Male	Vomiting 2 weeks	Rapid emaciation and anasarca		Death	Typical.
Schwyzer	Female	Vomiting 2 weeks	Occasional vomiting. Repeated attacks of diarrhea.		Death	Typical.
Cautley	Male	Vomiting	Constipation. Vomiting alternated. Tumor and peristalsis detected 7 days after admission.	Operation	Death 4 days	Findings typical.
Cautley	Male	Vomiting	Vomiting. Peristalsis. No tumor. Emaciation.	Operation	Death	Typical.
Carpenter	Male, 3 weeks	Vomiting 1 week	Accumulative vomiting. Tumor and peristalsis.	Operation	Death 22 days	Typical.
Carpenter	Female, 5 weeks	Wasting	Peristalsis and tumor	Operation	Death	Typical except that the longitudinal layer was described as hypertrophied.

TABLE OF REPORTED CASES OF CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS. CONTINUED.

Author	Sex and Age	Onset	Symptoms and Findings	Treatment	Result	Postmortem
Barghard	Male, 5 weeks	Vomiting birth	Wt. at operation 4 lbs. 11 ozs. Tumor and peristalsis. Vomiting, etc.	Operation	Death	Typical.
Barghard	Male, 6 months	Vomiting birth	Vomiting, emaciation and peristalsis.	Operation	Death	Typical.
Barghard	Male, 5 weeks	Vomiting 3 weeks	Peristalsis and tumor. Progressive emaciation under lavage.	Operation	Death diarrhea.	Typical.
Cleveland	Male	Vomiting 14 days.	No motion for 13 days. Attacks resembling tetany. Peristalsis and emaciation.		Death 3 mo. of age.	Typical.
McCaw and Campbell.	Male, 4 weeks	Vomiting 14 days	Vomiting. Peristalsis. No constipation or tumor.	Operation. Findings typical.	Recovery	
Nicoll	Male, 6 weeks	Vomiting 2 weeks	Vomiting and peristalsis. No tumor.	Operation. Findings typical.	Recovery	
Thompson	Male	Vomiting 13 days	Constipation and vomiting. No peristalsis or tumor.		Death	Typical except that esophagus is reported dilated.
Thompson	Male, 9 weeks	Vomiting 4 weeks	Breast-fed. Vomiting accumulative. Constipation. Bile in vomitus.		Died in convulsions.	Typical. Stomach to umbilicus. Esophagus dilated
Cautley	Female	Vomiting 3 weeks	Constipation. Peristalsis. No tumor. Stomach to umbilicus.	Dietetic	Death	Typical.
Cautley	Male, 4 weeks	Vomiting 3 weeks	3 wks. premature. Tumors and peristalsis. Wt. at birth 7 lbs.	Operation	Death ileocolitis	Typical.
Cautley	Male	Vomiting 3 weeks Wasting 5 weeks.	Constipation. Furred tongue. Accumulative vomiting. Emaciation. No tumor or peristalsis.		Death	Typical.
Cautley	Male	Vomiting	Vomiting invariable after food. Constipation. Emaciation.	Lavage	Death	Typical.

TABLE OF REPORTED CASES OF CONGENITAL HYPERTROPHIC STENOSIS OF THE PYLORUS.--Continued.

Author	Sex and Age	Onset	Symptoms and Findings	Treatment	Result	Postmortem
Sutherland	Male, 3 months	Vomiting 2 weeks	6 lbs. on admission. Vomiting marked. One mo. after treatment visible peristalsis.	Operation	Death	Typical.
Wachenheim	Male, 5 weeks	Vomiting 2 weeks	Alternating diarrhea and constipation. Vomiting 20–30 min. after feed. Visible peristalsis.		Death 7 weeks	Typical.
Hermann	Male	Vomiting 18 days	Vomiting, constipation, tumor and peristalsis.	Lavage	Recovery	
Saunders	Female	Vomiting 18 days	Tumor, vomiting and peristalsis.	No treatment allowed.		Typical.
Riviere	Male	Vomiting 2 weeks	Vomiting, emaciation, pronounced constipation. Vomiting 4 to 6 times a day. No peristalsis or tumor.		Death	Not allowed.
Gardner	Male	Vomiting 2 months	Diarrhea, vomiting, peristalsis 7 tumor.	Lavage	Recovery	
Rolleston	Male	Vomiting convulsions 2 weeks.	Vomiting, attacks of diarrhea, wasting, convulsions. No peristalsis or tumor.		Death	7 wks. at death. Typical findings.
Blackadder	Male	Vomiting 2 weeks	Constipation. Emaciation and vomiting. No tumor or peristalsis detected.		Death	Typical.
Batten	Male	Vomiting 5 weeks	Peristalsis. Tumor felt but often not palpable unless peristalsis was active.	Lavage feeding 4 mo. without distress.	Receovery	Pneumonia when 11 mo. age. Death findings typical.
Burghard	Male, 7 weeks	Vomiting 4 weeks	Tumor and peristalsis vomiting and constipation.	Operation	Recovery	
Burghard	Female, 8 weeks	Vomiting birth	Peristalsis and tumor Wt. at operation 5 lbs. 14 ozs.	Operation	Death	Typical.

1. The ingestion during fetal life of large quantities of liquor amnii and the stimulation of peristalsis by the presence of albuminoid substances in the fluid coupled with the presence of hydrochloric acid in the gastric juice, stimulating an imperfect coordination of the nervous mechanism with the resultant action of non-synchronous contraction producing a condition of apparent obstruction with resultant hypertrophy (Pryor, Ballantyne, and J. Thompson).

2. Pyloric hypertrophy due to irritation within the stomach during extrauterine life.

3. Functional derangement of the nervous mechanism with resultant incoordination of the different muscular layers.

4. That a primary narrowness of lumen, a congenital stenosis, is followed by compensatory hypertrophy of the stomach, and especially of the pylorus.

5. Developmental hyperplasia of the circular layer of the pylorus.

6. Ibrahim's theory consists in the presupposition of an anatomical stenosis in early infancy, undergoing spontaneous cure by compensatory hypertrophy.

These various hypotheses are interesting, but devoid of an element of conviction. The view of Cautley (an observer to whom we owe much for his many illuminating essays on this most interesting condition) that the pyloric stenosis is due to a developmental hyperplasia of the circular muscular layer of the pylorus I think the better theory. The report of a case in which there was found postmortem both a congenital hyperplasia of the circular muscle of the anus and the pylorus would tend, I think, to support Cautley's opinion of a developmental hyperplasia. Cautley's contention of a developmental hyperplasia may be supported by assuming the existence of a partial macrosomnia *i.e.* a congenital enlargement, perhaps hypertrophy of the circular fibers of the pylorus originating in the embryonic or fetal cycle and occurring previous to any trophic disturbance of the nerves that can be advanced as explanatory of the existing hypertrophy. The partial macrosomnia of a digit is an example. . . . The absence of hypertrophy of the longitudinal layer renders untenable Thompson's theory of functional derangement of the nervous mechanism of the pylorus. "Thompson presupposes two things: 1. That there is a spasm. 2. That there was an incoordination." Guthrie supports Thompson's theory by the following—normally the pylorus relaxes when the gastric detrusors are at work, but here it is held that the pyloric sphincter becomes obstinately contracted when relaxation is required and, in consequence of spasmodic overaction, muscular hypertrophy ensues. Tonic contraction need not give hypertrophy, but spasm must. "Prof. Cunningham, of Edinburgh says: In cases of long-standing pyloric obstruction it is not the sphincteric ring alone that is at fault and prevents the passage of the gastric contents into the duodenum. The circular musculature of the entire length of the pyloric canal, by its spasmodic contraction leads to the closure of the section of the stomach. The sphincteric cylinder in its whole length exercises a double function, and acts both as a retaining and as an expelling agent." . . . The early contention of Pfaundler that there is no hypertrophy of the circular layer, but that it is a normal pylorus in a condition of systole is absolutely fallacious, for the cartilaginous tumor has been seen to dilate and contract at operation without losing this cartilaginous consistency.

Congenital hypertrophic stenosis has no family tendency. Voelcker recites a case occurring in one of twins with the second baby normal. . . . .

Symptoms.—The vomiting is often characteristic, is many times projectile, assuming often an accumulative character. The date of onset in thirty-seven cases reported by Voelcker was as follows: four at birth, nine at two weeks, three at one week, eleven at three weeks, five at four weeks, two at five weeks, two at six weeks, and one at eight weeks. The vomitus is bile-free, though it may be yellow tinged. There is an increase of ferment activity. In an article compiled by Miller as a result of his original work in the examinations of stomach contents in atrophic dyspepsia, pyloric stenosis, and acid dyspepsia, the following interesting table is found:

Class	Quantity	Mucin	Ferment activity	Total acidity
Atrophic dyspepsia	Small	Absent	Low	Low
Pyloric stenosis	Large	Present	Usually high	Variable (usually low)
Acid dyspepsia	Large	Absent	Low	High

The stomach contents may be a great aid in the differential diagnosis. The vomiting may be painful and food is not relished. The breath is sweet and the tongue clean. The vomiting may disappear for long intervals. Improvement may or may not follow the cessation of vomiting. Fifty per cent. of these patients are breast-fed. There is nearly always a pronounced constipation. Cautley recites a case that had a large normal movement eight days prior to death.

Marasmus is generally pronounced, though some cases may show large gains irregularly. The loss of weight is gradual and generally persistent. However, Nicoll cites a case in which he had repeatedly dismissed the diagnosis of congenital hypertrophic stenosis on account of the child's "plump and well-nourished appearance." This case, despite the nourishment, died of exhaustion from vomiting and the postmortem specimen was typical. The proof of a clonic spasm of the pyloric sphincter is the occurrence of motions and the presence at times of diarrhea due to the overloading of an already atrophic intestinal tract.

A palpable pyloric tumor occurs in only 20 per cent. of the cases (Nicoll). In upward of 80 per cent. nothing abnormal can be detected through the abdominal parietes. I think Nicoll rather conservative and feel confident if the abdomen is gently kneaded and examined between the thumb and four fingers, as advised by Carpenter, that the tumor will generally be found palpable except in that small percentage of cases in which it lies buried beneath the hepatic or costal margin. The finding of a tumor is not considered as essential to positive diagnosis. The hypogastric region is prominent, although the stomach is not seen to "stand-up" with two transverse ridges, simulating peristalsis, as in pyloric spasm, due to acid dyspepsia. The tumor has the consistency of cartilage, is cherry-sized and may demonstrate contractility and dilatation. It is common to lose it after once palpating it.

Waves of peristalsis (left to right) are always present in well-marked cases. This finding is essential to diagnosis. Kneading, ingestion of food, or a local irritation will excite it.

Anatomy and Pathology.—The first indication of the pylorus in the fetal period is at the third month. It is formed from the foregut and the circular fibers are derived from the mesoblast. The pathology of congenital hypertrophic stenosis must arise during the fetal period, prior to any nervous mechanism peculiar to the pylorus. The longitudinal fibers extend down from the esophagus and some of them interlace with the circular fibers of the sphincter, constituting dilator fibers (Jonnesco, Luschka, and Cunningham). These fibers show no true hypertrophy and certainly no hyperplasia. Cunningham suggests an independent nerve-supply for the pylorus, allowing the possibility of an independent action related to the stomach as a whole. I can attach no importance to this hypothesis, granting an independent nerve-supply. It is noteworthy that no true hyperplasia has ever been shown to follow a spasmodic tonic condition of any sphincter. . . . . Congenital hypertrophic stenosis of the pylorus presents a distinct pathogeny. Dr. George Still says that a pyloric wall exceeding 4 mm. in thickness is pathological. Most postmortem reports give the pyloric lumen as barely admitting a probe. This is due to postmortem rigidity, for many operators have shown antemortem that the pylorus would admit a catheter (Dent, Burghard, and Stiles). Cautley's enunciation of the pathology is eminently proper, namely, that it is "simple redundancy of fetal growth." The pylorus is a well-defined cartilaginous mass, fusiform, sausage, cherry, or cylindrical in shape with a contracted lumen due to the mucous membrane folds. Microscopically there is a hypertrophy of the circular muscular fibers. No authentic count of the fibers or increase of the nuclei has ever been attempted to my knowledge. There are no inflammatory changes in the mucous membrane or submucosa. The stomach wall is thin and the pylorus well defined. The intestinal walls are atrophic. The esophagus may or may not be dilated. Finkelstein and carpenter have described an hypertrophy of the longitudinal layer, but Heubner humorously assigns their misapprehension to the microscopic examination of oblique sections. . . .

Diagnosis.—If the clinical picture was well known by general practitioners and if more postmortem examinations were performed on infants dying with persistent vomiting, I am certain that congenital hypertrophic stenosis would be more generally recognized and its occurrence would be found not uncommon. It is essentially important to make an early diagnosis for treatment to be efficacious. In trained hands incipient cases may be recognized, but for Cautley to say, "that mild cases may exist, that the symptoms may not be of much moment, and may be limited to dyspepsia and occasional attacks of vomiting, and that such cases may terminate in later life from dilatation of the stomach and hypertrophic stenosis of the pylorus," is a declaration that may be attended by dire results and I quote the statement but to condemn it. The picture is typical and one must insist upon the presence of this typical picture before subjecting these little patients to operation. Some authors insist on the presence and detection of the small, sausage-shaped or cylindrical cartilaginous tumor before making a positive diagnosis, others ignore its absence. It has been repeatedly shown that the pylorus may be adherent to the under surface of the liver, defying detection. I am personally of the opinion that the palpation of the small tumor is the least significant finding. I believe with Cautley in the great importance of the history and that one may always be able to differentiate this condition from Pyloric spasm due to acid dyspepsia. The finding of the tumor confirms absolutely the diagnosis. The distinct clinical entity is the following: A fine male baby is born, is generally breast-fed and doing well until the second to fourth week when vomiting, constipation, and marasmus supervene. The baby's diet is then changed without any amelioration of the condition. On physical examination visible peristalsis and tumor are found. The course is generally progressive, though marked improvement almost always follows lavage.

Prognosis.—Landerer in 1879 advocated the hypothesis that the pyloric stenosis of later life is congenital in origin. Cautley supports this contention. I had the good fortune to examine in London a pathological specimen of congenital hypertrophic stenosis in a small child eleven months of age. The history was that the child was treated in the hospital at the age of four months for constant vomiting since birth. There had apparently resulted a complete cure from gastric lavage. He returned to the hospital when eleven months of age with a severe attack of vomiting and diarrhea and died within a few days. At the postmortem the findings were typical of congenital hypertrophic stenosis. This case not only supports the possible correctness of Landerer's theory, but goes far in supporting Cautley's contention of an original developmental hyperplasia.

Treatment.— In Heubner's opinion many of these cases recover under medical treatment. While it is true that lavage with careful feeding has been successful in some of the reported cases, I think it cannot be gainsaid that the treatment is preeminently surgical and the mortality is directly dependent on the time of operation and the skill and celerity of the operator. Lavage is a valuable adjunct to the surgical treatment. Before the operation is performed a week's lavage should be resorted to. A compilation by Stiles, of Edinburgh, of the character and result of thirty-two operations performed for the relief of this condition will show the choice of procedure:

Operations	Cured	Fatal	Mortality
Gastroenterostomy (suture)	6	10	62%
Gastroenterostomy (button)	0	1	100%
Pylorectomy	0	1	100%
Pyloroplasty	3	3	50%
Divulsion	6	2	25%

Commerce Building.

TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY.

Meeting of May 27, 28 and 29, 1909. Held in Lenox, Mass.

The President, Charles P. Putnam, M. D., *of Boston, in the Chair.*

PRESIDENT'S ADDRESS.

Dr. Putnam said that the few words he had to say were in line with the addresses to follow on "The Position and Work of the American Pediatric Society Toward Public Questions." Physicians should take up a share of the work of public institutions for children in their own communities. Public institutions for children were in fact, to a great extent, great hospitals for chronic patients. The State's children, whether juvenile offenders, truants, dependents or neglected children, should not be taken as being on the whole healthy and normal. Unsanitary influences in the home are often responsible for the dependency and delinquency of children. Twelve years ago three unpaid boards of seven persons each were created by the General Court of Massachusetts to take charge respectively of the insane, paupers, and children's institutions of the city of Boston. To the latter department four separate divisions and several classes of children were handed over; the Marcella Street Home and Almshouse for children with 321 inmates; the Parental School and School for Truants with 149 inmates; the House of Reform with 144 inmates; and a large placing-out department. When they took charge of these institutions they had no conception of the great opportunity for betterment which was at once presented. He described the conditions found in these institutions and sketched what had been done for dependent children in the city of Boston. Work of this kind was demanded and it was incumbent of them to take their share of it.

THE POSITION AND WORK OF THE AMERICAN PEDIATRIC SOCIETY TOWARD PUBLIC QUESTIONS.

DR. THOMAS MORGAN ROTCH, of Boston, appealed to the Society to aid by its influence in safe-guarding early life. The chief point which should be aimed at would be to persuade the investigators who were doing such good work all over the country in connection with the different phases of early life that they did not know sufficiently all of the different sides of the various questions connected with children to allow them to control all of the work themselves. Many workers who were trying to reform the laws in connection with child labor should understand that their great efforts were appreciated by the medical profession. Children had been rescued from the mills and the various kinds of labor which they were made to perform before they were ready for it, then it was the province of the pediatricians to decide what those children were able to do. After this had been decided, it was the province of the legal profession to inform the legislators what laws should be made for the preservation of the child's health and proper development. This same reasoning applied to those who had charge of grading the schools and kindergartens, and also the physical sports, both of boys and girls, during their different stages of development. He then explained that the old methods used to determine at what age the child should be in the various grades in schools and when he should work, for instance, in the mills, had mostly depended upon the chronological age, as well as upon how the child looked on account of his height and weight. Dr. Rotch then said that children differed, even though they were of the same age, in both physical and mental development. As for judging by means of the chronological age, the results varied and were very elusive. The judges of criminal courts, and lawyers, in various cities, had told him that it was exceedingly difficult to find out how old children really were. A law might be made that a child must be so many years old before being allowed to work in the mills; and yet the mills were found to be filled with such children who were under the age limit. The reason for this was that false returns were continuously made and, in many cases, there was absolutely no record of when the child was born. Under these circumstances he allowed that height and weight differed in a chronological point of view by as much as one year and a half, and it was impossible to keep children out of the mills in a State where, for instance, the law said fourteen years, because although perhaps only twelve and a half years old the child seemed fourteen. For four years he had been endeavoring to obtain some more exact index, not a chronological age, but one of development. It was his intention to be able to decide when a child should work in the mills by determining whether he had proper strength derived from adequate development for such work. He explained that the osseous system corresponded to the steel frame work of a building; that the stronger and more perfect and the higher stage of development of the osseous system the greater the strength and the greater the resisting power of the child. He did not in any way ignore muscles and the condition of the various organs and the physiological conditions of childhood, but they were accessories to the skeleton, just as plaster, roofing and boarding-in of a building were necessary to make a good building outside of the steel framework. He wished to present to the Society for their consideration what he called an anatomic index. The development of the ephiphysis presented an important part of a child's development so far as his strength was concerned and showed what stage of development he was in. These epiphyses could be studied in all joints, whether of the shoulder, elbow, knee or ankle, but the joint that was the easiest to reach and most practical for forming the anatomic index was the wrist. Out of some thousands of cases of children carefully studied with the Roentgen ray, children who were believed to be normal after it had been proven that they had had no disease which would interfere with the development of the joints and in whom the physical conditions seemed to be normal, it was shown that in the vast majority of cases the normally developed wrist developed with the other joints. He, therefore, presented to the profession as an anatomic index the development of the wrist. This development could be carried on in successive grades from birth to fourteen years by making use of the appearance of the osseous centers of the carpal bones and the epiphysis of the radius and ulna. Having once made a division, for instance, alphabetically from "a" to "m," the radiograph could be taken of the wrist of the child, and this picture would represent the stage of the child's development. This classification for development could be used for all ages. In this way they could determine whether the child was ready to enter kindergarten, or into a grade in the school and keep the place, or what strain in athletic contests he should be allowed to undergo, and finally what forms of labor and work he was ready to perform. An index of this kind, instead of having to depend upon the ignorance or truth of the parents and guardians, would be entirely in the hands of the physician. Dr. Rotch spoke of the excellent work of Pryor, of the State University of Kentucky, and said he had been much encouraged when he noticed that his observations tallied with his own. Pryor had pointed out, and Dr. Rotch found it to be true in his investigations, that the development of the epiphysis, especially as seen in the osseous centers of the wrist, varied in different races and in different families, but that members of the same family have much the same development. The development of girls, however, in the early period of their existence, surpasses that of the boys of the family. This meant that the osseous centers of the carpal bones and epiphysis of the radius and ulna appeared earlier, perhaps as much as one year, in girls than in boys. It was also noted that twins had the same development for the same sexes. Dr. Rotch said he wished to impress upon the Society that in no way did he ignore other means of determining whether the child was ready to work or not, or to enter certain grades in school; the development of muscles and the functions of organs should be taken into account. The different stages of development should be grouped at different periods by which to regulate the different phases of a child's life and safe-guard strength. The precocious child with an undeveloped body should not be allowed to push upward in the grades in the schools; such an individual should wait until his development equaled his mental condition. Although in the future some better index might be found, all his investigations, supported by the work of Pryor, pointed toward the anatomical conditions at the wrist as being the best. He also stated that Dr. Crampton's investigations of the anatomic index of the pubic hair should point to the fact that the chronological age, as a guide in these matters, should in the future be put aside. He believed, however, that it should be retained for certain legal questions. Dr. Rotch showed a series of pictures of the development of the wrist and how certain pictures of development corresponded to the kindergarten age partly, to the school age partly, to the athletic age, and partly how to decide upon different forms of labor. He also showed how he had investigated the findings in joints to determine whether there had been any inflammation in the joints. Such cases should be thrown out, even though the joint became normal again for the reason that the congested condition of the joint caused the osseous centers to develop more rapidly in that joint than in others. Therefore, unless this be taken into account, the idea of the anatomic index would be defeated. Dr. Crampton's work showed most conclusively that the chronological age should not be used. The influence of the Society should be brought to bear upon educators as well as upon labor committees to influence them to look at the work which they were engaged in from some point of view other than their own.

THE NEED OF, AND THE RELATION BETWEEN, A DEFINITE ANATOMIC DEVELOPMENT AND CHILD LABOR.

DR. LINNAEUS E. LA FETRA, of New York, believed that the American Pediatric Society should take a lead in devising a plan for safeguarding child-life; the publication of the discussions of the Society in this matter would call the attention of editors and writers in the medical and lay press to its importance. The great difficulty in safeguarding the child was in the nonenforcement of the laws in the States where the laws were good. Physicians should take a part in the creation of public sentiment. The problems presented differed in various parts of the country. There was a lack of uniformity in legal requirements. A question which should be studied was, What was the minimum physical development for a child to undertake various kinds of work? The hours and conditions connected with the various kinds of work should also be investigated. In 1907 there were admitted to ten schools for the blind 242 new pupils, and of these fifty-nine, or about 25 per cent., were blind because of ophthalmia neonatorum. Blindness occurring in these fifty-nine children was needless. In New York 6,000 or 7,000 people were blind because the Credé method of prophylaxis had not been used. He believed the keystone in this matter was the establishment of an age limit for compulsory attendance at schools and the age of employment being fourteen years. The New York laws required documental evidences of age and a school course of not less than eight years. The only reason for an age limit was to determine the physical fitness of the child. No child less than 60 inches in height or less than ninety pounds in weight should be employed. A certain gynecologist had told him that it was his experience to find that shop girls were very apt to have an infantile type cervix and an undeveloped uterus from standing too much during their early menstrual life. He thought that size and weight were no indices of mental development.

THE NEED OF, AND THE RELATION BETWEEN, A DEFINITE ANATOMIC DEVELOPMENT AND THE ATHLETICS OF EARLY LIFE.

DR. SAMUEL S. ADAMS, of Washington, said that the American Pediatric Society had never taken the stand that it should have taken in national affairs. Having been intimately connected with legislation, constructive as well as obstructive, for the past thirty years in the Capitol, his observation had been that the medical profession was more apt to be engaged in obstructing legislation than in the construction of laws. If there was in any society a body of men competent to speak upon questions relating to children from their birth to maturity, it was this body. They should assume the position they were entitled to, and speak with authority on questions of public interest on the health and development of the child. They should take a decided stand in regulating the time at which a child should enter athletics in primary and in high schools and colleges. They should have a general supervision over the children until they were sixteen or eighteen years old. They should examine the children and advise the parent whether or not the boy should engage in baseball or the girl in basketball. In questions of this sort, such as concerned the child's health, whether of national or local import, the medical man was the one to step forward.

THE NEED OF, AND THE RELATION BETWEEN, A DEFINITE ANATOMIC DEVELOPMENT AND THE GRADING OF KINDERGARTENS.

DR. ISAAC A. ABT, of Chicago, believed that the anatomic index offered a possibility of great value in estimating the child's developmental condition. There were different kinds of kindergartens, and results depended as much upon the kindergarten teachers as upon the children. He believed that this work would be a great help in estimating the developmental condition of the child; some accurate index was very necessary; as yet they had no way of estimating the physical status of a child in the kindergarten; before sending a child to the kindergarten they had as yet no method of estimating the physical development, and he thought that if the anatomic index of children in the kindergarten was controlled by a fatigue curve, it might be valuable. In the idea of getting legislature to interfere, rushing headlong into the political arena, he did not think they are right; they had better find out how they stood in regard to Dr. Rotch's work. It was hardly the province of the Society to get tangled up in politics or political affairs. They should attempt to stimulate scientific work and keep out of the political arena.

THE NEED OF, AND THE RELATION BETWEEN, A DEFINITE ANATOMIC DEVELOPMENT AND THE GRADING OF SCHOOLS.

DR. CHARLES GILMORE KERLEY, of New York, believed that in a subject like the one under discussion, a very broad one, they should begin at the bottom, and that meant they should see that instruction was given in the homes to parents as to how they should live, how the children should live, and how they should bring up their children. The first five years of a child's life was a very important period as it related to development, nutrition, general care, and particularly to his later career as a citizen. He called attention to Dr. McDonald's statement that 35 per cent. of the children in the public schools were defective and 15 per cent. noneducational, education being lost upon them. The statistics based upon height and weight he believed to be unreliable. With regard to the position of the Society as to whether it should consider the matter relating to child study in a general way, he believed that if they did not do it they would be compelled to sit by and see others do it.

THE MEDICAL WORK IN THE JUVENILE COURT OF CHICAGO.

DR. F. S. CHURCHILL, of Chicago, read a paper which was based on the examinations of 2,758 children appearing before the Juvenile Court during the last year. He divided them into the dependent and delinquent groups. A dependent child was one who had not had efficient care. A delinquent child was one who had transgressed the law. Seventy-seven per cent. were of foreign-born parentage. Among the dependents 90 per cent.

were Americans, Germans, Polish, Italian, Bohemian, and Jewish. Among the delinquents 95 per cent. were the same plus Norwegians and French. In proportion to the total population the Poles lead. They paid especial attention to height, weight, chest girth, condition of the tonsils, adenoids, condition of the eyes, ears, teeth, heart, lungs, skin, and the frequency of venereal disease. Very little organic disease was found, but striking data were the high percentage of carious teeth and enlarged tonsils, cervical glands, defective eye-sight, ear affections, and frequent gonorrheal disease among the girls. There were practically no acute diseases because the probation officer was not allowed to bring any sick child to the court dispensary and, therefore, the spread of disease was prevented. Among the dependents, both boys and girls, during their earlier years, ran closely to the normal, although a little below. But among the delinquents the older boys and girls were very much below the normal. This showed the strain and the stress of life was beginning to tell even before the age of puberty. The exception to this general observation was the weight of sixteen-year-old girls; they averaged twenty pounds heavier than the normal girls. This was due to the fact that all these girls were handsome, well formed and very attractive to men who caused their downfall.

DR. L. EMMET HOLT, New York, felt sorry that such a large part of the work of the Society should be devoted to subjects of this kind; he believed the Society did its best work along research lines in matters relating to diseases of children. Research work should be encouraged. With regard to the anatomic studies, they should be controlled by observation of a number of people before they, as a Society, went on record as believing in them.

DR. KERLEY was surprised at Dr. Churchill's figures; he gave the number of children appearing before the Juvenile Court in Chicago as 2,758; in New York they numbered in one year over 11,000.

DR. CHURCHILL replied that this was the annual number of children that appeared before the Juvenile Court, and the number was diminishing rather than increasing, because of voluntary protective leagues that had been formed; they went out into the districts of the city uprooting dance halls, and soon did very good work.

DR. WALTER LESTER CARR, New York, said that they were organized to study diseases of children, and he asked how far they could go without overstepping. Personally, he was of the opinion that many of them as individuals, as members of committees, etc., could do a good deal, but the work of the Society should be carried out in a medical way.

DR. ROTCH said that what he presented was only one factor of a problem which must be worked out step by step. He did not see why they should not take up one factor of the problem and see whether it was right or wrong. As to devoting themselves entirely to medical subjects, it seemed to him that all over the world it was recognized in the great teaching centers that prophylaxis in children was a great part of the work of the medical profession. To say that this is not medical work was wrong. He believed it was their duty to give their knowledge to the public. It was as much a medical as any scientific article Dr. Carr could write on the subject; it was *prophylaxis*. He did not see how they could call what he offered them as sociological: they were absolutely medical facts. In New York there were 10,000 children taken from the sweat shops and mills, and this was done by a good set of people, and they should be told by the physicians just what should be done with these children. They were not entering politics; how were the judges and lawyers to decide what was best for these children unless they told them. Some one must say what should be done with these children, and who could do it better than they. Height and weight were elusive; statistics were elusive and misleading; such statistics would not be used at all if a better method was found. They were behind the times if they kept on using such statistics and if they did not use what was shown to be better. Prophylaxis was a great part of medical work of the future.

A FEW OF THE THINGS WHICH THE PEDIATRIST SHOULD TEACH.

DR. P. J. EATON, Pittsburg, made a plea for common-sense teaching of pediatrics. Children were born, as a rule, healthy, and yet many died before the age of three years; the moral, physical, and mental training of these children should begin with birth. Babies had certain rights; they had a right to live and to be comfortable and grow, and this all depended upon certain rules which should be enforced from birth. The baby should have accurate and regular habits; they should be taught to employ certain functions, to feed at certain intervals, etc. It was easy to teach a young baby to defecate regularly. Taking a bath, followed by a meal and then a nap was very simple, but it was worthy of teaching. The children, too, should be taught to sleep. It was said once that "she who rocks the cradle rules the world"; now it was "she who rocks the cradle spoils the world." The Lord knew best when He made breast-milk for babies. Mothers and nurses should be taught what good milk was and where it could be obtained, if the breast-milk was not obtainable. The mothers should be taught that the advice of a skilled medical man was far superior to what was found in printed books. The less the baby was handled the better. He asked that more sensible clothing should be made for the baby, that more fresh air should be given the growing child in order that he might have plenty of oxygen for metabolism. After the first few days of life the child should be in the open air, and he should sleep where there was a free flow of outdoor air in abundance. As the child grew the question of diet became a live one. A good rule to follow was that "things which need chewing require teeth for grinding." Some believed it to be a crime to put the lancet to the gums; teething was a physiological process when it was normal; if normal there should be no interference, but if the gums were tough they should be cut. To sweeten a child's disposition often nothing was better than to lance the gums.

A CASE OF CEREBRAL HEMORRHAGE (BIRTH) WITH OPERATION.

Dr. Frank S. Meare, New York, reported the case of a child delivered by a difficult forceps operation. The child was born asphyxiated and was with difficulty resuscitated, but became of good color. That same evening there was found a facial palsy of the left side; the left arm was rigid, and the hand was flexed at the wrist. The left leg was rigid, and the knee-jerk was exaggerated. There were convulsive movements, especially of the upper part of the body. Thirty hours after birth the color was still good, the pulse strong, and the child cried a good deal. The next morning the child was cyanotic, and Dr. Taylor was called in. Operation was decided upon. A clot was found and removed. No improvement followed and the child died one hour later. The postmortem showed that in addition to the clot that was removed at operation, there was an extension of it along the fissure of Sylvius.

Dr. Alfred S. Taylor presented the specimen which showed that the beginning of the hemorrhage was around the outer end of the Sylvian fissure; there was an extension of the clot, however, through the fissure of Sylvius toward the base of the brain and an extension forward under the frontal and backward to the temperosphenoidal lobes, and a particularly marked extension downward to the front surface of the hind-brain.

The cases he considered best for operative interference were those in which the clots were confined to the upper surface of the brain. The best evidences of the presence of clot would be the focal symptoms of the motor apparatus. When the clot was situated at the base of the brain there would be pressure upon the vital centers, and respiration and circulation would be influenced. To obtain the best results one should operate at the earliest possible moment.

Dr. La Fetra said that when the cord was found to be around the neck of the newly-born infant, one should be on the lookout for cerebral hemorrhage occurring shortly after birth. In looking up the reports of the Sloane Maternity Hospital he found that in a large proportion of the cases of cerebral hemorrhage the cord was found to be encircling the neck.

Dr. Henry Koplik, New York, said that the operation for cerebral hemorrhage in the new-born was one that must cause one to think before undertaking it, and it was very difficult to decide whether to operate or not.

Dr. John Lovett Morse, Boston, said he had been struck by the irregularity of symptoms in these cases, and especially by the late development of symptoms. He always thought that they appeared within the first ten or twelve hours, but there were reports of cases in which the first symptoms appeared on the third or fourth day. We should remember, too, that there were other conditions which gave symptoms of a similar nature, of cerebral pressure. One should be very cautious in making a diagnosis of cerebral hemorrhage in the new-born. It was a serious thing to recommend an operation for cerebral hemorrhage when a dose of castor oil would clear up the symptoms. A bulging of the fontanel indicated cerebral hemorrhage. Another symptom he had not seen mentioned was the flowing of blood from the nose or from the back of the throat, the blood presumably coming through the cribriform plate of the ethmoid bone. In doubtful cases resort might be had to lumbar puncture.

Dr. Holt said that when one saw these children when twelve or fourteen months old or older, with symptoms resulting from cerebral hemorrhage occurring at birth, one felt justified in doing anything; yet he agreed with Dr. Morse that the difficulties of diagnosis were extremely great. In the first place all these hemorrhages were very profuse, and one could not be sure at operation that all the clots were removed. The bulging of the fontanel was the best single symptom in diagnosis. No importance should be attached to the bloody fluid in lumbar puncture. They should have localized symptoms; but when the symptoms were general, as rigidity and convulsions, they were very much in the dark. In some cases operated upon, nothing had been found.

Dr. Putnam asked Dr. Taylor the number of successful operations that had been recorded.

Dr. Taylor replied that Cushing, of Baltimore, had saved two out of four cases operated on. The two cases in which he had been interested in died a few minutes after operation, but both were in bad condition before operation.

Dr. Freeman, in connection with cases with bulging fontanels, said that he saw such a case in consultation a short time ago and with this there were very marked symptoms. Operation was refused. At five months the child had improved and was improving ever since. There were now no convulsions; there were no indications but what the child was getting quite well without operation.

Dr. Churchill said that when one considered what happened to children when they were allowed to live under these circumstances, he thought that one was justified in advising almost anything for their relief.

Dr. Samuel McC. Hamill, Philadelphia, said he was in accord with what Dr. Holt had stated regarding the difficulty in diagnosis. He had seen a number of these cases and even followed many to autopsy. He had seen many cases closely simulating cases of cerebral hemorrhage which yet at autopsy showed nothing.

Where there had been definite localized symptoms there had been no mistake in the diagnosis.

Dr. Taylor did not want to be misunderstood as saying that every case that developed cerebral symptoms should be operated upon. If there was a focal lesion, the best chance for recovery was offered by operation. This subject of surgical interference in these cases should be taken up, studied, and fought over by men from different standpoints. The dangers of the operation he thought were apt to be magnified. If a child was subjected to a short operation, and if very little general anesthetic was given, there was not much danger.

DANGER TO THE NEW-BORN FROM GAS HEATERS.

Dr. E. W. Saunders, St. Louis, said that in many houses no provision was made for the ingress of fresh air or the egress of foul air, and it was hoped the builders of houses would be influenced in correcting this. The apartment house was inimical to an increase in the population; gas heaters were also inimical to the life of the newly-born. Many cases of atelectasis might be due to carbon monoxide poisoning. He reported the case of a nurse and baby sleeping in an air-tight room with a movable gas heater burning all night; death resulted from the generated carbon monoxide gas.

Dr. Adams reported the case of a government clerk who returned home from his work to find his mother, his wife, and baby dead, a cooking stove in the room had been burning and all three had died of carbon monoxide poisoning. The wife was evidently cooking and was taken sick; the mother was found in a kneeling posture over the woman with a bottle of ammonia at her side. The baby was in a cage on the floor dead. There was great danger in the creation of carbon monoxide as shown by the experiments of the Agriculture Department; it was known as the "back-fire." If certain stoves had no protector, and if the fire was lighted and went out, and then relit, there was great danger of carbon monoxide being created.

SPASMODIC STENOSIS OF THE ESOPHAGUS: A CASE DEMONSTRATED BY THE X-RAY.

Dr. L. E. La Fetra, New York, reported this case which was interesting from the standpoint of diagnosis. He saw the patient last April because of attacks of vomiting; the child was sixteen months of age. He was told that on the third day after birth there was a discharge of dark blood from the mouth. Nursing was attempted for three and a half weeks and then stopped. The vomiting or regurgitation occurred at or after every feeding. The stools were small. Artificial feeding had to be employed, and the child did well for one week and then again regurgitated. Upon carefully questioning the family he learned that the vomiting occurred while taking food, and seldom afterward.

Two or three hours after feeding strings of mucus would be brought up. When the baby was one year old he weighed fifteen pounds. A tube was passed six and a half inches when it met with an obstruction. A large quantity of mucus was obtained. The baby vomited alongside the tube. The baby vomited a yellowish mucus with the fresh food after taking four spoonfuls in the morning. He thought there was a pouch of some size along the esophagus, and that the vomited matter came from this pouch rather than from the esophagus. Coughing was brought on by swallowing. After feeding there was dullness to the right of the sternum. The radiographic pictures taken by Dr. Caldwell before and after eating were shown. The *x*-ray before feeding showed nothing abnormal; but after feeding there was shown a shadow which extended to the seventh dorsal vertebra, terminating in a conical-shaped pouch toward the liver. The stomach was apparently contracted, with an hour-glass appearance. This was a case of spasmodic stenosis of the esophagus, and not a case of cardiospasm.

Dr. Rotch said that this showed what the *x*-ray could do; this was one of a set of cases in which the Roentgen ray was indicated as a means of diagnosis. He said he had had one case of a pouch being situated lower down in the esophagus, and they were afraid to pass a stiff sound, and it seemed impossible to make a diagnosis. This patient was Roentgen-rayed and a diagnosis made. In time this patient died of exhaustion and at the postmortem conditions were found that would not warrant the use of the sound, because of the danger of perforating the sac.

INFLUENZA: THE PART IT PLAYS IN HOSPITAL INFECTIONS; THE VALUE OF CULTURES AS A MEANS OF DIAGNOSIS; INFLUENZA CARRIERS.

Dr. L. Emmett Holt, New York, referred to the frequency with which infections occurred in hospitals, and said that it was his opinion that influenza was responsible for a large number of them, and an attempt had been made to see how much a part it did play, and experiments had been undertaken since January 1, to determine what value could be attached to throat cultures as a means of diagnosis. Cultures were taken of the throats of all the inmates of the Babies' Hospital including the nurses and resident physicians who came in contact with the children. It was known that the bacillus of influenza only grew in media containing hemoglobin. Much of the success depended upon the manner of taking the culture. The bacilli were difficult to obtain unless bronchial secretions were present. The child was made to cough by irritating the pharynx with a piece of cotton on an artery clamp. There were 312 cultures taken from 198 persons. Cultures were positive in eighty-five, suspected in forty-two, nonsuspected in forty-three, and among these were fifteen nurses. Cultures were negative in 112, suspected in sixteen, nonsuspected in ninety-seven, and among these were twenty-eight nurses. Among 110 positive influenza, the pneumococci were positive in fifty-three, and negative in fifty-seven. Among 202 negative influenza, the pneumococci were positive in fifty-six and negative in 146.

Among forty-seven routine autopsies the following was noted: Marasmus and terminal pneumonia, eight cases; influenza bacilli positive in two, negative in six, the pneumococci positive in one, negative in seven. Acute bronchopneumonia, fourteen cases; the influenza bacilli positive in two, negative in six; the pneumococci positive in one, negative in seven. Acute bronchitis, two cases; the influenza bacilli positive in two, negative in none; the pneumococci positive in one, negative in one. In tuberculosis of the brain and lungs, eight had meningitis. Pulmonary tuberculosis, ten cases; influenza bacilli positive in three, negative in seven; pneumococci positive in two, negative in eight. Nontuberculous disease, thirteen cases; influenza bacilli positive in one, negative in twelve; pneumococci positive in four, negative in nine. Of 140 cases suspected, forty-three gave positive and ninety-seven negative. Among the cases that were negative at the first culture, eleven were positive afterward. Only sixteen healthy individuals showed the presence of the influenza bacillus; eight of these showed the pneumococci, while eight did not; four had Klebs-Loeffler bacilli. Twenty-eight healthy persons showed neither the pneumococcus nor the influenza bacilli. When an otitis media was present, there was great danger of looking upon it as the principal disease. In no case was the organism recovered from the heart's blood. In conclusion he said that a great deal of value might be attached to the sputum as a means of diagnosis, and much depended upon the technic employed in taking the cultures. The influenza bacillus persisted in the bronchial secretions. The cultures showed the association of the influenza bacillus with the pneumococcus in a great number of the patients. Infuenza bacillus was a large factor in house infections and was hard to deal with.

Dr. Rotch said that there was yet much to be learned in regard to this disease, and one was apt to make a diagnosis before he should. This was a difficult disease to deal with. Dr. Rotch referred to the work that was being carried on at the Massachusetts General Hospital in Boston; they recognized that there was a clinical influenza and the work there seemed to show that the supposed organism of influenza was not the cause of the disease; that was, it was not the cause of influenza any more than were other organisms. They found that 25 per cent. of the cases of common cough or cold in the interepidemic periods, without the clinical symptoms of influenza, showed the influenza bacillus in large numbers. They concluded that the influenza bacillus, so-called, must be excluded as a cause of clinical influenza. They had no more right to say that this organism had any more to do with influenza, from an etiological standpoint, than the staphylococcus, pneumococcus, or other pyogenic cocci. This was the result of their investigations; whether these would be upheld later he did not know.

Dr. John Howland, New York, said that in the recent epidemic of influenza in New York it was very difficult to find the typical so-called Pfeiffer bacillus. There was, however, a large group of allied organisms.

Dr. Koplik referred to the ambiguity of these organisms. Several years ago he took cultures from the throats of every child in his service, looking for the diphtheria bacillus; among 300 cases, children with normal throats, thirty-five had to be sent out because of the presence of the diphtheria bacilli in the throat, although they had no diphtheria. This brought up the question of the ambiguity of the microorganisms.

Dr. Abt said that in a hospital with which he was connected in Chicago now and then there would appear an epidemic of diphtheria and its origin could not be traced. One of the dispensary doctors took a culture of everybody's throat and he found that one nurse, a little blonde, had a great number of bacilli in her throat and was responsible for these outbreaks of diphtheria. She was a dangerous person to have around, and so was sent to the isolation department. Day after day cultures were made and she reacted positively. Later she was taken back into the wards, and, another outbreak occurring, she was sent away. The epidemics then ceased.

Dr. Hamill said that for two years in an institution in Philadelphia they had met with a large number of infants who gave charts of the character of Dr. Holt's, and they had tried to determine the cause of the peculiar recurring temperatures. He had been having cultures made from the nasal secretions and had been trying to persuade himself that the temperature depended upon some infectious organism.

Dr. Thomas S. Southworth, New York, said that there seemed to be a diversity of opinion as to the exact organism responsible for this condition, but it was certainly a fact that there existed a clinical entity which by exclusion they were in the habit of calling influenza. During the months of January, February, and March they had had a series of ward epidemics of what they called influenza; the peculiar temperatures that were recorded during that time were apparently due to the ward epidemics going from child to child; they were accompanied, too, by a large number of ear cases which was also confirmatory of the diagnoses made. A great many of these temperatures were very striking in the way in which they fell after paracentesis was performed. This led him to believe that a good many of these cases of rises in the temperature during the prolonged attacks of influenza were due to the otitic involvement. There was no doubt regarding the infectiousness of the cases. Influenza should be considered as much an infectious disease as many of the minor exanthemata and the cases isolated. This fact must be recognized in the future if they are to save these babies from serious complications.

DR. MILLER believed that the presence of the diphtheria bacilli in the throat of a person was at all times a menace. One of the resident physicians at the hospital carried these bacilli in his throat for six or eight weeks, and at last he got diphtheria. If the presence of these bacilli in his throat was a menace to himself, they must be a menace to others.

DR. LA FETRA said that during the past two years he had to stay the hands of the aural surgeon from doing sinus and thrombosis operations, as well as operations upon the mastoid. They were too hasty in wanting to operate.

DR. HENRY L. K. SHAW, Albany, referred to an epidemic of influenza that occurred at St. Margaret's home four years ago; two babies died and the report came in that the deaths were due to influenza. The thought occurred to him to obtain cultures and try to demonstrate the bacillus. The pathologist told him that they could not be obtained from the nasal secretion, but that they should try to get them from the blood. The question then arose, How could they get them from the blood? He finally found an expedient. When the baby cried, the temporal vein became very prominent; then a needle was inserted and the blood obtained. They found that many of the cases called influenza were not influenza at all. He reported a case of influenza meningitis.

DR. CHURCHILL reported a case of influenza meningitis occurring in twins four or five days old. They were suddenly taken sick, but with no signs of a typical meningitis. There was nothing to account for the condition of affairs, but twenty-four hours before death there appeared the characteristic symptoms of meningitis. At autopsy a very virulent meningitis was found. The cultures showed a perfect growth of the influenza bacillus.

DR. KOPLIK reported six cases of influenza meningitis seen within the last few years.

DR. KERLEY had seen many operations done which he did not consider justifiable, and he took the attitude that an aurist must have definite symptoms of his own, and not consider the fever in these cases at all.

PNEUMOCOCCIC INFECTION.

DR. WALTER LESTER CARR, New York, said that the pneumococcus might be recovered from the blood in croupous pneumonia and similar affections, and that much of the grip and grippal affections were in fact due to the pneumococcus. He gave a review of the literature in which pneumococcic infection occurred in various organs and tissues of the body. He reported one case, a child of eighteen months, with pneumonia which was followed by a very marked invasion of the conjunctiva; there was a very marked pneumococcic infection and recovery followed without any trouble. But the child at last succumbed because of an attack of meningitis six months after the pneumonia.

REPORT OF A CASE OF LONG-STANDING EMPYEMA, WITH A NOTE ON RACE AS A PREDISPOSING FACTOR IN THE OCCURRENCE OF EMPYEMA.

DR. ALFRED HAND, JR., Philadelphia, reported the case of a girl, three and a half years old, who weighed eight pounds and fourteen ounces. From the history given it seems that empyema had existed for about twenty months. A study of the statistics of the Children's Hospital of Philadelphia for ten years showed that the number of cases of empyema among the white children was about 10 per cent. of the pneumonias; among the colored children empyema occurred in less than 1 per cent. of the pneumonias. There were three cases of empyema among the colored race, but none of them showed the metapneumonic form. In the case reported, resection of a rib was made under cocaine, and one-quarter of an inch of thickened pleura penetrated. About one ounce of greenish pus was evacuated. The child succumbed one month later during the heated term. It was interesting to note that there were 852 cases of pneumonia among the white children, and ninety-nine of them had empyema, more than 11 per cent. Whereas among 205 pneumonia cases occurring in colored children, only two had empyema, a percentage of less than 1 per cent.

DR. FREEMAN said that they had found at the Foundling Hospital that resection of a rib in these cases was absolutely unnecessary.

DR. ADAMS referred to the difficulty of diagnosis in these cases. In the Children's Hospital from 40 to 50 per cent. of the cases were colored and yet among these cases he could not recall a typical case of empyema occurring.

(To be continued)

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Meeting of April 15, 1909.

The President, JOHN A. WYETH, M. D., *in the Chair.*

This meeting was held under the auspices of the *Section on Pediatrics.*

The Pathology of the Status Lymphaticus with Lantern Demonstration.—DR. ALFRED SCOTT WARTHIN, University of Michigan, stated that an enlarged thymus plays an important part as an etiological factor in cases of sudden death, and that back of this enlarged thymus is an interesting pathological picture which means something. While not prepared to state exactly what this meaning is, he had a few ideas on the subject. Deaths due to mechanical obstruction from enlarged thymus presented rather peculiar symptoms. Enlarged thymus with sudden death associated with enlarged lymphatic glands was observed as early as the seventeenth century. In the eighteenth century the part played by the thymus was recognized. Dr. Warthin had been fortunate in seeing a number of these cases. Until recently the minute or microscopical anatomy had not been touched upon. His experience had covered the whole group uusally seen in this disease. There was sudden death during anesthesia, spontaneous sudden death, sudden death after examinations or after having gone into the water, etc. There were cases associated with marked asthma, with marked stridor; also cases in which diphtheria antitoxin had been administered. During the past four years 10 per cent. of the cases dying in this sudden manner were autopsy cases and these did not include cases of Graves' disease showing enlarged thymus. There was acromegaly in one case and pernicious anemia in another. The fact that the enlarged thymus was a feature constantly present in all these cases had led him to look upon this thymus as an important thing to consider. Their pathological findings led him to look around for living cases. This because of an idea he had that this condition was not so very uncommon and might be diagnosed during life. In his own town he found two children with peculiar stridor, and he could state positively that these children had enlarged thymus; the percussion area was large and definite and the *x*-ray showed the shadow of the enlarged thymus. Some cases had been apparently cured under simple treatment. The cases were treated on the ground that there existed a chronic affection; the symptoms would disappear sometimes to return again. In all cases there was enlargement of the thymus, and in the majority there was more or less enlargement of the other lymphatic structures, not necessarily all, but sometimes one set of lymphatics and sometimes another set. The lymphatic glands presented a rather uniform appearance in all cases examined microscopically; the spleen, bone-marrow, and other tissues also presented a fairly uniform picture. The one absolute feature present in all cases was a hyperplasia of the thymus. The lymph nodes in two cases seen shortly after birth showed a different picture. Many lantern slides were used to illustrate Dr. Warthin's remarks.

Dr. L. Emmett Holt, in discussing the clinical features of status lymphaticus, said that he was not quite in accord with what Dr. Warthin had said regarding the clinical features of this condition. His experience with status lymphaticus had been mostly with infants of from four to eighteen months of age. In these children the clinical manifestations were quite different from those that Dr. Warthin described. In order to illustrate, Dr. Holt related the case of an infant three months of age, weighing six pounds that had been very difficult to feed and had been under his observation for a month. During this time the infant seemed to be perfectly well except for symptoms referable to the digestive tract. The digestion improved and the child gained two pounds in weight, when one night about 10 o'clock the child vomited and seemed quite ill. At 3 o'clock the next morning the child was in collapse. The temperature was 103° and respiration 100 per minute. There was intense prostration, moderate dyspnea, but no stridor. The child did not rally from this condition and died thirteen hours after the first symptoms. The autopsy showed acute congestion of the lungs with beginning bronchopneumonia, the general lesions of the status lymphaticus, together with an enormous thymus resembling the one Dr. Warthin had shown in the picture. Dr. Holt said that most of his cases were of this type. They were children slightly rachitic, who had been regarded as previously healthy and who even when under observation for some time had shown no symptoms referable to the thymus. From apparently slight cause they suddenly developed most severe symptoms, and death usually followed in from twelve to twenty-four hours. The associated condition which most frequently had seemed to act as a cause which precipitated the acute attack was bronchitis, bronchopneumonia and in several cases the beginning of some acute infectious disease. Four symptoms were usually present in such cases in the terminal stages of the disease; intense prostration, dyspnea and cyanosis, convulsions, and fever, which was often very high. The dyspnea was seldom of the obstructive type In one case which was under observation for thirty-six hours, intubation was tried, but gave no relief. Although he felt satisfied that he was dealing with an enlarged thymus, he had found it impossible to map out the thymus by percussion. He had tried this in other cases in which he felt certain that the thymus was enlarged, but failed; yet at autopsy an enlarged thymus was found to be present. He therefore believed that mapping out an enlarged thymus in infants was an uncertain procedure. It could not be relied upon. Children suffering from status lymphaticus had very feeble resistance and showed great susceptibility to many adverse conditions. The slightest thing, like the prick of a needle, anesthesia, acute indigestion, the beginning of some acute illness, seemed sufficient to disturb the delicate balance and precipitate the fatal attack. He was of the opinion that the great prostration, the extreme restlessness, cyanosis, convulsions, etc., point to a toxic condition rather than to mechanical obstruction. It was often hard to reconcile the clinical picture with the pathological findings. He could not accept the obstructive theory as being applicable to all cases of status lymphaticus, especially in young infants. It was not an extremely uncommon condition, one or two examples occurring in the course of a year in 120 autopsies. The condition was often, though not always associated with rachitis. The enlargement of external glands noted in older children he had not found to be common in infants.

Dr. Joseph A. Blake discussed the surgical aspects of status lymphaticus. He said that hitherto he had held a view quite different from that taken by Dr. Warthin. Some six or seven years ago he had been unfortunate in meeting with eight cases of sudden death within one year in Roosevelt Hospital. These were attributed to status lymphaticus. These cases had occurred suddenly either during or shortly after the administration of an anesthetic. All the patients died without symptoms of obstruction to respiration. They seemed to go into collapse and to die from heart failure.

In one case death occurred twenty-four hours after the anesthetic was administered, the patient dying in coma. In this case death might possibly have been due to necrosis of the liver, resulting from the anesthetic, although at autopsy the signs of status lymphaticus were present. One patient died at the end of an operation for Graves' disease while the bandage was being applied. This patient had gone through the operation well, but the heart failed, respiration ceased, and death occurred within a few minutes. This patient was an adult and at autopsy the thymus weighed 135 grams. Although there was a very large thyroid as well as thymus, there was no interference with respiration. There were mentioned in literature several cases of so-called thymic asthma with obstructive symptoms which seemed to have been cured by an operation which might be termed thymopexy. The thymus was not removed, but stitched to the manubrium so as to relieve tracheal compression. It was shown a few years ago that in intubating these patients to relieve pressure the tubes would not pass the thymus unless they were extremely long. The question of interest to the surgeon in cases of status lymphaticus was the choice of an anesthetic and also whether operation should be performed at all in these cases. When only a minor operation was called for, such as the removal of adenoids or tonsils, one should hesitate. The diagnosis of status lymphaticus was so uncertain that it was almost impossible to refuse to operate in cases that demanded it. Most of the cases reported had died under the administration of chloroform. Three of the four deaths that occurred under his observation were under ether narcosis. He preferred, however, to give ether and not chloroform, as in his experience death had resulted from cardiac failure. It might be said that some of the deaths attributed to the status lymphaticus during the administration of chloroform might be due to the effects of the chloroform upon the liver.

Dr. A. Jacobi believed that cases of sudden death during status lymphaticus were not always due to that condition alone. One case described showed at autopsy an extensive bronchopneumonia; the respirations in this case had numbered 100 per minute, with marked increase in temperature, vomiting, etc. One should remember that not only were the blood-vessels of the lungs enlarged, but those in the neighborhood as well. In regard to the surgical aspect of these cases Dr. Jacobi recalled an operation performed by Rehn at Frankfort-on-the-Main in 1893 or 1894 in which the thymus was not removed, but was stitched to the anterior wall. There were a number of such cases now on record. Within the past two months he was sure he had seen the report of a case in which a favorable result had been obtained by the removal of the entire organ. One point should not be lost sight of, that was that the space between the sternum and the vertebral column was a narrow one, only 2.2 cm., and slight changes in the size of the blood-vessels were likely to give rise to an obstruction of respiration, and to such an extent that even death might occur. In such cases occurring in children if the head was bent forcibly backward or if the babies were lying in an uncomfortable position, the difficulty in respiration was removed by bending the head forward. The diagnosis of enlargement of the thymus was not so difficult as it appeared to some; one who saw these cases often enough might easily make a diagnosis in the majority of them. One could not detect the thymus gland while the baby was lying on its back, but if the baby was turned over and raised gently the thymus would be found. Dullness behind the manubrium was quite characteristic of enlarged thymus. Dr. Jacobi related his first case of this nature; when he arrived at the house the baby had just died. He tried to detect the thymus with the baby lying on its back, but could not. When he turned the baby over he could readily detect this organ. When the child was again put on its back he could not find the thymus, but upon turning it again it was readily detected. The status lymphaticus might be the cause of difficulty in respiration, occasional convulsions, and sudden death partly from an hypertrophy and partly from congestion of the thymus. Laryngismus stridulus had seldom anything to do with enlarged thymus; many of these cases were due to cranial rickets. A considerable amount of cranial and meningeal injection as well as edema of the brain was present in these cases. In some cases there was a beginning hydrocephalus. If the rickets was successfully treated the patients got well, but that took time. The prognosis depended upon the possibility of relieving the cerebral changes connected with rickets; until that was accomplished one could not be sure that the baby would not die suddenly. Five or six weeks were required to get the baby in nonrachitic condition. The laryngismus in most cases did not result from the enlarged thymus, but was the result of the edema of the brain, which was connected with rachitic tabes. There were certain complications in most of the cases; most were adipose, heavy, rotund, and backward in muscular development. In all these cases it was necessary to improve the general condition. The child should be carefully watched and the head kept well forward.

Dr. John A. Wyeth, in discussing the paper, referred to an article by Dr. W. Humes Roberts, of California, published in the *Laryngoscope* for 1908; this paper reported a series of seven cases of death occurring in children who were operated upon for adenoids, and in which, postmortem, the status lymphaticus was demonstrated. In these cases death occurred under the anesthetic or immediately after the operation, and the thymus was found enlarged in every instance. A series of thirty cases was also reviewed of status lymphaticus which ended fatally during narcosis. Chloroform was the fatal agent in seventeen cases; ether in six; chloroform and ether mixed in five, and nitrous oxide gas in two. Dr. Wyeth said that his personal experience was confined to a single case, a boy of eleven years, who came to the clinic two hours after having eaten a hearty meal. The child had received an injury to the ring-finger from which had resulted infection, lymphangitis, and a metastatic abscess in the epitrochlear region at the elbow. The boy had a temperature of 101°, but complained of no pain. There was no appreciable lymphatic enlargement in the neck or eleswhere, and nothing in the action of the heart to suggest status lymphaticus. Chloroform was given as least apt to produce nausea so soon after a meal. A single incision was made and the abscess cavity mopped out with gauze and the anesthetic discontinued. With its discontinuance the child gave a gasp, the pulse ceased at the wrist, and all efforts at resuscitation which were kept up for half an hour failed. The child had died instantly from heart paralysis. At an autopsy made by the coroner no mention of an enlarged thymus was made, but the glands of the mesentery were enlarged and soft. The physician who performed the autopsy pronounced the cause of death due to chloroform, the patient suffering from status lymphaticus.

Dr. John Howland said that there was not much for discussion upon so unsettled a subject as status lymphaticus. There was the greatest difference of opinion in regard to the cause of death and the evidence of compression. As Dr. Warthin had stated, there was a division into two camps, those who believed that pressure caused death and those who did not believe this. It was undoubtedly true that evidences of compression had been found at autopsy, but such observations had been extremely rare; the great majority of pathologists had failed to observe it. Friedleben, Paltauf, and Richter expressly stated that they had never seen it. Paltauf dissected the trachea from above and split it before opening the thorax as Dr. Warthin insisted upon, and always with negative results.

Dr. Bovaird used this method for many years at the Foundling Hospital and had never seen compression, and during the last seven years at the same institution, Dr. Howland said that his experience had been similar. It seemed to be the consensus of opinion that there was almost always lack of evidence of compression at autopsy. Some claimed that the congestion or edema responsible for the pressure disappeared after death. This contention made clinical proof in opposition necessary. In the great majority of instances the victims of status lymphaticus died suddenly. Theoretically it was impossible to conceive that a congested thymus could exert sufficient pressure to cause death in an individual who up to the very time of his decease showed no signs of dyspnea. The testimony of those who had seen children die suddenly was also conclusive. In the course of fifteen years Pott saw four children die of status lymphaticus while he was examining them. There was cyanosis, convulsive movements, and gasping respiration, but in every instance the heart had stopped beating when he examined it, and attempts at respiration were continued for a time. Such was not the case with asphyxia. Escherick had had similar experience. There was lack of great and persistent cyanosis in children dying with symptoms that had lasted for several hours. The edema that one would expect from pressure on the great veins was also lacking. These children had dyspnea, but it was a rapid panting dyspnea and not like that seen with actual obstruction, and there was not the supraclavicular, suprasternal, and epigastric retraction that would result if air were prevented from entering the chest. The dyspnea came and went with great rapidity and death might occur without any. In cases that had been operated upon for thymus obstruction with recovery dyspnea had been constant and unremitting. It had lasted for weeks in Siegel's and Rehn's case. It had lasted three months in Ehrhardt's case and in von Purrucker's two and one-half years. Almost all of those who have observed the clinical course of such cases deny that the symptoms of tracheal obstruction have been present. Therefore it seemed to him that except in a very small percentage of cases anatomical and clinical evidence of death from pressure was wanting. We were still without a satisfactory explanation for death in status lymphaticus.

Dr. James Ewing said that while in Vienna, in 1895, he had seen Kolico demonstrate several cases of "constitutio lymphatica" at autopsy. In these cases the thymus was persistent or enlarged, the faucial, intestinal, and splenic lymphoid follicles were hyperplastic, the aorta was usually small, there were often signs of rachitis, and in the older subjects there was a peculiar feminine type of physical development. These features were very striking and the condition was entirely new to him, not having been described at that time in American medical literature. Yet within a few months after returning from Vienna he had encountered two fatal cases, one a young girl who died under ether narcosis, and the other a parturient woman who died unexpectedly from a trivial hemorrhage. Status lymphaticus had now become a well-recognized condition of great clinical significance in relation to sudden death. It was frequent enough to be kept constantly in mind, being found in from 1 to 3 per cent. of autopsies. It had been found by Ohlmacher in many cases of epilepsy. Hannseman had emphasized its importance in Graves' disease, and he himself had observed it in four of five fatal cases of that disease. It figured in most fatalities from short submersion in water, and was the chief underlying condition in fatalities under narcosis. Wiser had recently shown that it was present in most cases of fulminant meningitis, an observation which was verified by Norris and in Germany, so that it must stand as an important predisposing cause of fatal meningitis. Dr. Warthin's contribution seemed important as furnishing evidence from the proliferation of endothelial cells in the lymph nodes that there was a toxic element in the condition, and his observation of a case of advanced atrophy of the abdominal lymph nodes was distinctly new. The chief point of debate was the etiology of status lymphaticus. Many had thought that in young subjects death must result from sudden compression of the trachea by the large thymus, and he was inclined to believe that in such subjects this might be an important consideration. The compression of the trachea or vagus could not figure in the majority of the cases. The disease was not one of young children, but occurred in adults in whom there could be no question of death by pressure. An interesting point of view was that of Bartel, who held that the condition might have a definite relation to tuberculous intoxication. There was occasionally some histological resemblance of the hyperplastic lymph nodes to tuberculosis. An opinion largely held in France was that the enlarged thymus yielded an excess of internal secretion, with hyperthymization of the system. This theory was open to experimental study. Systematic investigation from these theoretical standpoints was, therefore, indicated. Careful clinical analysis of the cases was also discussed. Status lymphaticus was not always fatal, but must influence the course of many diseases. Yet one saw in clinical literature little reference to the part played by this condition in the so-called idiosyncrasies of disease.

Dr. Charles Norris had never seen a single example of sudden death from status lymphaticus, either in young or in adults, from compression of the trachea. His experience with children had been somewhat limited, but he had seen many cases of this condition among adults. One might conceive that an enlarged thymus might compress the trachea, but it was inconceivable that the thymus could increase in size so suddenly through hyperemia, as the thymus was not a vascular organ. Dr. Norris emphasized the point that a clinical diagnosis of status lymphaticus could not be made out, but that a diagnosis could be made quite readily at autopsy. He did not believe that patients died from status lymphaticus alone, but that as they grew up they became more susceptible to infections of various kinds and that this might account for the sudden deaths attributed to status lymphaticus.

Dr. William P. Northrup said that in regard to the narrowing of the trachea without causing symptoms, he wished to remind the audience that a child could breathe through the small caliber of an intubation tube. This seemed incredible in the first days of intubation. Dr. Northrup reported the case of a child, eight months old, whose tonsils and tongue were so swollen and who had so many adenoids with congestion that breathing was very difficult; the child could scarcely get air past the base of the tongue and swollen tissues, and breathing was so difficult that the child could not sleep, and exhaustion was imminent. Nasal intubation was thought of. The smallest-sized drainage-tubes were passed through the nostrils, past the swollen adenoids and tonsils, down to the larynx. The child slept seven hours that night. These drainage-tubes were barely large enough to admit the smallest probe. The point that Dr. Northrup wished to make was in regard to the size of the trachea. An extreme enlargement of the thymus must be present to cause sudden death from compression of the trachea.

Dr. S. J. Meltzer doubted that the sudden deaths in status lymphaticus were respiratory deaths. The phenomena of acute asphyxia were so characteristic that there would be no doubt as to the nature of the cause of that death, even the layman present would state simply that the child suffocated. The descriptions all indicate that we deal in these cases with sudden cardiac failure. However, this could have been caused by the sudden increase in the size of the thymus. A normal heart might be arrested many times without any serious consequences, but it was different with hearts that had lost their stability from one cause or another. Dr. Meltzer said that he knew from experimental experience that under certain conditions a single slight stimulus applied directly to the vagus would cause sudden and fatal stoppage of the heart. It could, therefore, be assumed that in the cases in which the stability of the heart was undermined either by chronic respiratory insufficiency, as in the cases mentioned by Dr. Howland, or by diphtheria or any other infection or intoxication, a sudden enlargement of the thymus might occasionally be capable of exerting a pressure upon both vagi within the thoracic aperture sufficiently strong to bring a heart to a fatal standstill. From this point of view one could accept Dr. Warthin's theory that in cases of status ymphaticus a considerable amount of lymphoid material was being absorbed by the system. These substances perhaps assisted in robbing the heart of its "factors of safety." Dr. Meltzer was interested in Dr. Warthin's view that the enlargement of the thymus was a compensatory process.

Dr. Charles G. Kerley related three cases of sudden death which occurred in status lymphaticus in which there were no evidences of tracheal obstruction. In one of these cases the child had convulsions and lived only a few minutes after he had seen it. At postmortem a very large thymus was found. The second case had convulsions and died suddenly, but without any evidences whatever of tracheal obstruction. In the third case the the conditions were similar to those in Dr. Holt's case, all inhibitory control seemed abolished and the child died of exhaustion due to tremendous efforts at breathing. In this case there were no evidences of obstruction, but at autopsy an enlarged thymus was found.

Dr. Warthin, in closing the discussion, said that he did not know exactly what status lymphaticus meant, aside from sudden death, that did not seem to be associated with other things. It seemed that they were in danger of classing all sudden deaths as due to status lymphaticus. They should be very careful as to what they called lymphatic struma. In his opinion it meant an enlarged thymus. Where there were evidences of enlarged thymus, vomiting, and other symptoms, the enlarged thymus might be the cause of death. In literature, especially in France and Germany, there seemed to be an increasing amount of evidence favoring the obstruction theory, pressure being upon the vagus nerve, the recurrent laryngeal, or the trachea. Pressure on nerves might, of course, play a part in the causation of sudden death. Intoxications might occur, but they were not the cause of death in these cases. The enlarged thymus might be the result of intoxication and this enlarged thymus might be the cause of death.

REVIEW.

SURGICAL DISEASES OF CHILDREN. A Modern Treatise on Pediatric Surgery. By SAMUEL W. KELLEY, M. D., Professor of Diseases of Children, Cleveland College of Physicians and Surgeons; Surgeon-in-Chief, Holy Cross Home for Crippled Children; Pediatrist, St. Luke's Hospital and City Hospital; Pediatrist and Orthopedist, St. Clair Hospital, etc., Cleveland, O. Octavo, 768 pages; over 300 illustrations. Cloth, $5.00 net. E. B. Treat & Co., Publishers, New York.

A modern treatise on pediatric surgery has been lacking among the various publications which the the expanding interest in all matters pertaining to children has recently brought forward. It is eminently proper that such a volume should be written by one who knows the child thoroughly, medically as well as surgically, and it is a matter of congratulation that an all-round pediatric man, such as Dr. Kelley is, has undertaken this work. One cannot doubt his broad qualifications after reading the opening chapter upon "Examination and Case-taking" which should be familiar to all who essay to deal with children, while the succeeding subsections upon preparation for operation, anesthetics, shock, hemorrhage, etc., show that they are written with a full knowledge of the child's peculiarities and needs.

To note the chapters upon the surgical diseases of the head, the brain, the spine, the air passages, thorax, abdomen, and abdominal and genitourinary organs, rectum and anus, together with special chapters on hernia, club-foot, hair-lip and cleft palate, burns, and scalds, gives only a partial idea of its comprehensiveness.

The value and interest either for diagnosis or treatment of a volume which discusses othopedic questions solely as they affect the child and treats separately of fractures and dislocations in the various usual and unusual places from the same standpoint is at once apparent. There are few who have to do with children who have not desired some such compact groupings as are included in the chapters upon muscles, tendons, fasciæ, bursæ, and cellular tissues, or in that upon surgical diseases of the lymphatics. This regional arrangement while bringing together many subjects not otherwise related, favors the inclusion of matters which would escape classification. No single volume can contain all the wisdom in such an extensive field, but Dr. Kelley has gone far toward bringing it together from scattered sources, in well-arranged and available form, and as such his work will be widely appreciated by those who have long awaited a modern text-book upon this subject. Until someone demonstrates that he can do it better, Dr. Kelley's taertise will retain its unique position among the text-books. T. S. S.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Scoliosis Following Infantile Paralysis.—(M. P. Desfosses (*Presse Méd.*, March 13, 1909) says that we no longer hold the opinion that scoliosis is of osseous origin. The lesion is a weakness of the muscles of the back, with a consecutive atrophy of the vertebræ. One of the causes is infantile paralysis. The musculature of the back is very complex and its functions are not well understood on account of the difficulty of studying the various groups separately. There is a functional independence of the dorsal and lumbar regions. Infantile paralysis affecting the thorax produces a deformity with the convexity directed toward the healthy side; when it affects the sacrolumbar region the convexity is directed toward the paralyzed side. A scoliosis with double curvature will result from a lesion involving both the dorsal and lumbar regions.

Treatment of Hydrocephalus by Drainage into Vein of Neck.—R. D. McClure (*Johns Hopk. Hosp. Bull.*, April, 1909) describes an operation, performed upon six dogs, for the formation of an anastomosis between the subdural space and the external jugular vein. This is made by means of a transplanted vein, one end of which is passed through the dura and there sutured, the other entering the proximal stump of the divided external jugular at such a point that valves in the latter or in the transplanted vein prevent the reflux of blood into the subdural space. In three cases the transplanted vein was found patent several weeks or months later, although no fluid was present, as would have been the case with hydrocephalus, to keep it so. The one baby on whom the operation was performed had a sudden rise of temperature and died soon after.

Removal of Tonsils.—G. E. Waugh (*Surg., Gyn., Obst.*, April, 1909) emphasizes the fact that it is the character, not the size of a tonsil that is important, and that even a small imbedded septic tonsil is a source of danger. He regards the guillotine operation as incomplete and advises shelling out the entire tonsil, under complete anesthesia, through an incision in the anterior pillar just external to its line of junction with the tonsil.

Noma.—L. R. G. Crandon, E. H. Place, and W. G. Brown (*Bost. Med. Surg. Jour.*, Apr. 15, 1909) state that noma is not proved to be a contagious disease, and need not be isolated. Any uncared-for mouth, particularly in a sick child, and especially after measles, may contain B. fusiformis and spirochete gracilis. In such a mouth these organisms may be found without ulceration or in the lesions which have been described as stomatitis gangrenosa, Vincent's angina and noma. The lesions, in other words, may be only round the roots of teeth, on tonsils and pillars, on inner sides of cheek, in nasal fossæ, on the external ear, and about the genitals. Any of these conditions, including the extensive gangrene and sloughing of so-called noma, may be different stages of the same disease, which may be, therefore, considered as not necessarily a specific disease, but the successful ingress of mouth bacteria into tissues rendered nonresistant by uncleanliness and preceding disease. The writers record seven cases of noma with two recoveries. Smears from all showed the fusiform bacillus and spirochete gracilis. The fact that the former is anaerobic suggests that hydrogen peroxide might be of therapeutic value, and it proved so in the reported cases. Cleansing of the mouth must be continud even after noma develops, as the cause of death in all the cases was inhalation pneumonia. After necrosis takes place, the actual cautery alone or after excision of the gangrenous area is called for. The patients should be kept out of doors, chiefly to diminish the chance of pneumonia.

Acute Suppurative Ethmoiditis."—F. Krauss (*Med. Rec.*, April 24, 1909) records two cases of acute suppurative or phlegmonous ethmoiditis in children resulting in death. He says that this affection causing orbital and cerebral symptoms is not as rare as has been thought. It is often rapidly fatal, especially in the young. In the symptomatology of acute suppuration or phlegmonous ethmoiditis there is usually a history of a cold in the head and more or less intense neuralgia for several days. This is marked by swelling of an erysipelatous type along the nose to its root and above it on the forehead. The intense edema of the lids of the affected side, together with great tenderness and edema of the whole inner wall of the orbit, is very suggestive. Indications for operation in acute ethmoiditis are sudden increase in temperature, delirium at night, tumor formation in the inner wall of the orbit, the slightest exophthalmos. Operation should not be delayed too long. As in appendicitis, early operation is a harmless procedure, late operation generally useless. When there is bilateral exophthalmos, operation is usually useless, as the disease has probably extended through the cavernous and circular sinuses, causing a general toxemia and pyemia, or fatal brain lesion.

Adenoids, Nocturnal Incontinence, and the Thyroid Gland.—In recording a number of cases of nocturnal incontinence of of urine successfully treated with thyroid extract, Leonard Williams (*Lancet*, May 1, 1909) says that adenoid vegetations can no longer be regarded as a cause of nocturnal enuresis. He asserts that when the two conditions are associated, which they often are, but as often are not, they are due to a common cause—insufficiency of the internal secretion of the thyroid gland. This insufficiency accounts for the vast majority of cases of nocturnal enuresis in children, as shown by the fact that the exhibition of thyroid extract will in a comparatively short space of time effect not only a cure of the enuresis, but a great amelioration of many coexisting evidences of ill-health. It will be observed that in none of the writer's cases did belladonna and hyoscyamus, which constitute the sheet-anchors of the text-books, play any part in the treatment. Where it was thought desirable to employ anything in addition to the thyroid extract, these additions consisted of tonics, such as iron, arsenic, and iodine.

Relation of Mineral Metabolism to Nutritional Disturbances in the Infant.—W. Weinberger (*Pediatrics* March, 1909) reviews a number of recent contributions to the subject of inorganic salts in metabolism. He says that in the milder cases of nutritional derangement of the infant an excess of fat in the food is the active cause. The gradually weakened organism is unable to completely assimilate the fat, and soaps are formed in the alimentary canal. This occurrence reduces the amount of soluble mineral salts necessary for the production of new body substance, and causes the retardation of the normal increase of weight. Removal of the offending food constituent—the fat—is naturally followed by a complete restitution. The retention of the inorganic salts will cause a steady increase of body weight and the infant begins to thrive. The more serious cases present the same etiological correlations as the first stage, though in a more pronounced and aggravated form. Elevations of the weight curve alternate with depressions, phenomena caused by a greater interference with the mineral metabolism. Close attention to the composition of the food in the direction above mentioned will frequently have the desired results. As the excess of fat in the food and the consequent lack of inorganic salts available for metabolic purposes are the factors to be eliminated, we can understand why the otherwise ideal food of the infant, mother's milk, fails to show its curative action in these cases. We need only remember the lower salt content of human milk and its richness in fat in order to find the modification suitable for this morbid condition. If the whey of mother's milk or even of cow's milk is administered, the objectionable features are eliminated. The relation of the most serious form of nutritional disturbance to an impaired mineral equilibrium has not been conclusively demonstrated. But the presence of large amounts of the simpler fatty acids suggests the likelihood that similar conditions prevail. These may be aggravated by the real acidosis arising from the insufficient assimilation of carbohydrates, which is the characteristic feature of this affection.

Use and Abuse of Proprietary Foods in Infant-feeding.—Edmund Cantley (*Practitioner*, May, 1909) says that proprietary foods are not really necessary in ordinary circumstances. They are, however, often of very great value, more especially the malted foods, provided that they are used with discrimination as additions to the diet, and not as substitutes for cream or milk. Generally speaking, in the first three months of life, the only permissible proprietary foods are those made from condensed milk, with or without the addition of cane-sugar, or of a completely malted flour. These foods are also useful, under certain temporary conditions, in the second three months of life. At this age, too, we can make use of the completely malted carbohydrate foods as an addition to the milk mixture instead of sugar; of the more or less malted foods, in a similar manner, provided that they are given in small quantities and do not produce flatulent distention of the intestines; and even of the foods consisting of unchanged starch, especially those which undergo partial conversion in the process of preparation, and, at the same time, partially peptonize the milk proteins. In the third three months of life, mothers constantly clamor for the addition of some food to the milk mixture. Simple barley water, gradually thickened, is sufficient, and will educate the child in the digestion of starch. Almost all of the meat preparations consist of extractives of no nutritive value, perhaps stimulating to the digestive functions, possibly throwing an extra strain on the liver and kidneys. The high proportion of salts and extractives is liable to cause thirst and diarrhea. Diarrhea is especially apt to be induced by peptone preparations. Some of the meat jellies, though not nutritious, have a pleasant flavor and are comforting to a feverish infant who refuses food. They are still more comforting to the anxious mother who fears that her child will starve and has profound faith in these preparations. In small quantities they do no harm. Similarly, a hot, clean fluid, such as beef-tea, is pleasant to the febrile tongue and disordered digestion. As ordinary articles of an infant's dietary, these foods must be condensed.

Congenital Bronchiectasis.—Z. Capuzzo (*Rivista di Clinica Ped.*, May, 1909) gives two forms of congenital bronchiectasis—atelectatic and fetal. When for any cause a portion of the lung remains unexpanded, during inspiration there is a negative pressure which brings about dilatation of the bronchi still accessible to air. These bronchiectatic conditions occupy a single lobe of the lung or a small portion of one, there being no signs of inflammation or of anthracosis. These portions may or may not communicate with larger bronchi. Such a condition may be well borne throughout life. Atalectatic bronchiectasis is extremely rare, only nine published cases being found, of which the author gives an account. Fetal bronchiectasis may be total or partial. It arises from a cystic degeneration of the interior of a bronchus with all its collateral branches. Nineteen cases have been published. As to the etiology little is known. There seems to be a combination of a passive mechanical action due to the increase of liquid transuding from the capillaries, with an active proliferation of the epithelia not truly neoplastic, but hyperplastic. Fetal bronchiectasis may depend on an arrest of development after the third or fourth month of fetal life, with hyperplasia of the epithelium. The symptoms are cough, dyspnea, cyanosis, and asthmatic attacks, coming on some weeks or months after birth.

Acquired Venereal Infections in Children.—Reporting upon 187 cases. F. Pollack (*Johns Hopk. Hosp. Bull.*, May, 1909) says that the acquired venereal infections in children are far more common than the medical profession or the laity realize, and the increasing frequency of the infection of baby girls by criminal infection makes it a matter of the gravest concern to the social worker, the sanitarian, and the legal protectors of the community. Clinically, the venereal infections in children run a milder course, as regards grave complications, than is the rule in the adult, but the number of complications and the duration of the disease seem almost identical. The duration of the disease, as in the adult, is variable, and cannot be prognosticated either by the intensity of the attack or the severity of the complications. Treatment seems not to influence the course of the disease. As all treatment directed to the vagina is painful and without beneficial results, he has for some time past used protargol simply poured over the vestibule, and the child soon learns that she is not to be hurt, and submits quietly, whereas under the former methods it required three people to hold and treat a six-year-old child, and the mothers had similar or more difficulty at home. In protracted cases the syrup of the iodide of iron or the elixir of iron, quinine and strychnine are beneficial. The etiology of these cases is usually very evident. The hymen is either nicked in several places, presenting a characteristic serrated free border, or it has one tear extending from the margin down to its vaginal attachment, usually somewhat to one or the othersside, not directly in the median line. In the secretion as it pours out of the vagina or urethra typical gonococci can readily be demonstrated, but not in that which covers the pudendum which does not stain at all or only feebly. Prophylaxis seems the most important remedy for this condition. We must recognize the superstition that an infected person may transmit his disease to a virgin and be cured thereby, and try to correct them.

Discharge of Cerebrospinal Fluid from the Nasal Fossæ.—A. Vigouroux (*Presse Méd.*, May 15, 1909) says that cerebrospinal fluid may flow from the nose when a communication has been established between the cranial cavity and the nasal fossæ. This may occur with a fracture of the base of the skull, caries of the sphenoid or ethmoid, or with an enlargement of the openings of the cribriform plate, due to an increase of pressure of the cerebrospinal fluid. Fractures of the sphenoid and ethmoid are extremely rare. Increase in the pressure of the cerebro-spinal fluid may be due to tumors of the brain. Autopsy has shown these cases to be due to injury to the base of the skull, caries of the bones, or extreme hydrocephalus. The flow is preceded by headache, vertigo, hebetude, and epileptic convulsions when it arises from increased pressure. These symptoms improve when the flow begins, and recur when it stops. Diagnosis of this fluid from the fluid from the nasal mucous membrane may be made by examination of the fluid. If it is from the nasal fossæ it is viscous, contains many pavement and ciliated cells from the lining of the nose, and coagulates with acetic acid. The cerebrospinal fluid is clear, limpid, specific gravity of 1.006, and contains chloride of sodium. The amount flowing from the nose may be very large, even several pints. Acceleration of the flow by inclination of the head forward is a sign of brain fluid, while examination of the nose will exclude inflammation of its interior. The liquid seems to flow through the enlarged orifices in the cribriform plate and membrane intended for the passage of the olfactory filaments. This ease of communication with the brain is a phenomenon not without danger, since it facilitates infection.

Gastric Digestion of Infants.—T. W. Clarke presents a review of the literature (*Amer. Jour. Med. Sci.*, May, 1909) and a study of the stomach contents of normal and pathological infants (*Same*, June, 1909). He finds that the motility of the infant stomach varies inversely to the concentration of the food. The more dilute the food, the more frequently may the feedings be given. Lime-water does not reduce the acidity of the gastric contents, the neutralizing of a portion of the acid being overcome by an increased stimulation of hydrochloric acid production by the gastric glands. This may even increase the amount of acid available for digestion. Sodium citrate acts on the acid in the stomach, converting it into sodium chloride and thus markedly reduces the "available hydrochloric acid." Barley-water seems to have no constant effect upon the chemistry of gastric digestion in the infant. The type of infants who vomit persistently may be divided into two classes—those suffering from hypoacidity and hyperacidity. Test feedings should be given to this type of infants to determine to which class they belong. A 5 per cent. milk-sugar solution seems to be the most satisfactory feeding to determine fine differences in the gastric contents. This may be followed by a mixture of milk one part, water two parts, to determine to what extent the gastric glands are capable of responding to stimuli. For the lactose solution thirty minutes is the most satisfactory time to allow the feeding to remain in the stomach; for the milk mixture sixty minutes. On purely theoretical grounds it would appear that when the acidity is low, either small doses of alkalies or of hydrochloric acid are indicated; while in hyperacidity, sodium citrate holds out the best hope of benefit. Protein digestion in the infant's stomach is slight and is proportional to the amount of hydrochloric acid in the organ.

Pepsin in Infant Stomach and Dependence of its Digestive Power upon Hydrochloric Acid.—W. R. Ramsey (*Arch. Ped.*, May, 1909) has made 47 examinations of gastric juice from infants varying in age from eleven days to ten months. He finds (*a*) that the gastric juice of normal breast infants contains pepsin; (*b*) that the stomachs of infants suffering from acute digestive disturbances usually contain pepsin; (*c*) that the stomachs of infants suffering from pylorospasm contain both pepsin and hydrochloric acid in greater quantity than the stomachs of normal infants of the same age; (*d*) that the stomachs of chronic atrophic infants frequently contain no pepsin; (*e*) that when these chronic atrophic infants begin to improve in health and to gain in weight, the stomachs again contain pepsin; (*f*) that the gastric juice of normal infants is capable of transforming proteid into peptone, and that it is able to do this without the addition of any other acid than that found normally in the stomach; (*g*) that the pepsin in the gastric juice is capable of active digestion when lactic acid and no hydrochloric acid is present; (*h*) that both hydrochloric and lactic acid may be present in the gastric juice without pepsin, and that pepsin may be present without either hydrochloric or lactic acid.

Intestinal Worms and Appendicitis.—F. D. Donoghue (*Ann. Gyn. and Ped.*, June, 1909) records the case of a girl of twelve years, with no history of previous intestinal trouble, who had had abdominal pain for six hours. She had localized pain and muscular spasm, a pulse of 100 and temperature 104.6° F. The appendix showed no marked gross lesion, but was removed. When opened, its lumen was found to contain several small fecal concretions about which were clumped pin-worms.

Kyphosis with Spinal Crest.—Marie Nageotte-Wilbouchewitch (*Arch. de Méd. des Enf.*, April, 1909) describes a form of kyphosis which is very rebellious to treatment. It occupies the preferred location of kyphosis in the adult, the maximum curve being at the sixth or seventh dorsal vertebra, and is characterized by prominence of the spinous processes of three or four vertebræ, forming an elongated crest at about the angle of the scapula. The vertebræ forming the crest are generally the sixth, seventh, and eighth. More rarely the crest is lower down. The mobility of the spine at this location is always less than normal. When the child lies on his stomach the crest does not entirely disappear, and on raising the legs does not form a concavity, as would be the case in the normal child. When pressure is made on the summit of the crest the neighboring regions become incurved, that is the cervical and dorsal regions become more curved. There is no true ankylosis, for suspension restores the contour gradually. The crest is the key of an arch, and the point of departure of a more extended kyphosis of the cervico-dorsal region. This kyphosis increases with age and appears very early in the life of the child, at from three to five years of age. It is believed by the author to result from a congenital malformation of the vertebræ, since the same condition is seen in parents and children. The treatment consists of suspension, respiratory gymnastics to develop the thorax and counterbalance the kyphosis, correct attitude when working, and repose on the back.

Serum Treatment of Cerebrospinal Meningitis.—L. E. Holt (*N. Y. State Jour. Med.*, June, 1909) discusses the treatment of this disease by the serum of Flexner and Jobling and cites the results in 523 cases, the figures being furnished by Dr. Flexner.

He says that the initial dose for any case should not be less than 30 c.c.; and that in cases in which a larger amount of fluid can be removed, particularly in older patients, and in very severe cases, as much as 45 or 50 c.c. may be advantageously given. Opinion has also undergone a change regarding the repetition of the dose. Instead of waiting to see whether improvement follows the first dose and giving the second dose after two or three days, it has been found best to give a full daily dose for three or four days to make the destruction of the bacteria certain. In very severe cases, such as those of the fulminating type, the repetition of the dose at shorter intervals than twenty-four hours may be necessary. A number of doses given quite near together are much more effective than the same quantity of serum distributed over a longer period. The daily dose should be given until the fluid becomes absolutely clear. The figures given by Dr. Flexner include 523 cases from widely scattered sources. Of this number, 368 terminated in recovery and 155 in death, a mortality of 29.6 per cent. No case has been included in this report in which the clinical diagnosis was not confirmed by an examination of the cerebrospinal fluid. The only cases excluded are those (about 20 in number) in which the patients were practically moribund at the time of the first injection and died in a few hours after it was made. The cases treated in the first two years of life were fifty-nine with a mortality of 42.4 per cent., which the writer contrasts with one of 90 per cent. in a series of sixty-one cases treated without the serum. The figures for the first fifteen years give a mortality of 12.7 per cent. for 110 cases injected during the first three days; of 23.3 per cent. for 120 cases injected from the fourth to the seventh day; and 44 per cent. for 91 cases injected after the seventh day. In the cases tabulated by the New York Health Department in 1905, the duration of the disease is given in 350 patients who recovered. In only 3 per cent. was it one week or less; in 50 per cent. it was five weeks or longer. In 220 cases treated by serum the average duration of active symptoms, fever, etc., after the first injection was eleven days. In 270 cases in which the reports give information upon the termination, the disease ended abruptly, or by crisis, in 69, or 25 per cent.; gradually, or by lysis, in 201, or 75 per cent. *Relapses*, or a recrudescence of the disease after it was apparently under control, occurred in about 5 per cent. of the cases. Complications and sequelæ were very infrequent. There are certain limitations in the serum treatment. It is of no value in cases of meningitis not due to the meningococcus. No improvement is to be expected in late cases in which all acute symptoms have subsided and in which chronic hydrocephalus is present due to a basilar meningitis. While the serum is capable of arresting the inflammatory process, it cannot remove lesions already present.

The Meninges in Scarlatina.—René Bernard (*Arch. de Méd. des Enf.*, April, 1909) says that the meninges in infections react in three different ways, which may be differentiated by lumbar puncture. First, there may be a lack of reaction on account of feebleness of the system or lack of virulence of the microorganisms, the liquid containing bacteria but no cellular elements; this is a meningeal infection. Again cells may be present, generally lymphocytes, with or without microbes contained within them; here we have a simple meningitis. Finally, puncture shows polynuclears, with or without microbes, here there is not only a simple anatomical reaction, but there is a symptomatic picture accompanying this reaction, an acute meningitis, the examination of which shows the characteristic modifications, an acute scarlatinous meningitis. This infection is somewhat rare, and primary infections are still more so. They are generally secondary to ear suppurations. This condition is caused by various microorganisms, and is a late complication in scarlatina. It is accompanied by headache, vomiting, delirium, stiffness of the neck, disturbances of sensibility, of reflexes, sphincters, and pupils, by Kernig's sign, and coma. The termination is generally fatal. The infection may reach the meninges in three ways—by the blood, the lymph, and by direct propagation. Lumbar puncture is an important factor in the treatment of this condition, combined with sedatives and electrargol.

Scarlatina.—H. A. Fairbairn (*N. Y. State Jour. Med.*, June, 1909) says that the care of the skin, the diet, and the cleansing of the upper air passages make up the important factors in treatment. The medical treatment is symptomatic. It is not logical to ascribe the disease to the streptococcus. The writer suggests to the pathologists that they utilize the scales to form an antitoxin, or a vaccine it may be.

Preventable Blindness.—J. C. Edgar (*N. Y. Med. Jour.*, May 15, 1909) finds that in the study of the prevention of blindness due to infant ophthalmia two facts stand out more boldly than any others, namely: 1. The frequency with which these cases occur in the practice of physicians themselves, although the profession is ever ready to place the burden of the blame upon the ignorant and careless midwife. 2. The number of cases of the disease that are attacked in spite of the fact that silver nitrate was used at the time of birth. Regular physicians and midwives are about equally responsible because they either do not use preventive measures at all or use them in a perfunctory manner. Two important measures looking to the early control of ophthalmia neonatorum have recently been proposed in New York State: The *first* is the early notification of births to the health officer, and the *second* such change in the form of the certificate of birth as will draw the attention of the physician and midwife to the prevention of infant ophthalmia, a statement whether any propylactic against ophthalmia of the newly born has been used, and if not any, the reason for omitting its use.

Blindness of the Newborn.—P. A. Morrow (*N. Y. Med. Jour.*, May 15, 1909) advocates the education of the public in regard to the cause of blindness of the new-born rather that simply arousing public sentiment to demand the use of silver nitrate. His argument is that, admitting that there are some conscienceless men who, enlightened as to the possible and even certain danger of marrying with an uncured venereal disease, nevertheless, for selfish or sordid reasons, take the risk, or rather subject their family to the risk of infection, such a man would more likely take this risk if assured that medical science had discovered a simple, safe, and efficacious remedy for its prevention, and that in case of its failure, the entire responsibility would be placed upon the physician, while his own agency would be covered up and concealed. Social tradition holds that it is a greater violation of conventional propriety publicly to mention this infection, than privately to contract it and carry the poison home to the family. Let the public be enlightened as to the true facts so that the educational value of the truth may have its full force and effect. In sacrificing truth to expediency we sacrifice not only the health and lives of women and children, but the principles of humanity and justice.

Effects of School Life upon the Vision of the Child.—N. B. Harman (*Proc. Roy. Soc. Med.*, May, 1909) has examined the reports of the examination of the eyes of 1100 children. These show that by far the greater proportion of the cases of bad vision are due to natural conditions of the eye—that is, hypermetropia and hypermetropic astigmatism. These are congenital conditions, and there is reason to believe that they are the normal conditions of human eyes. New-born infants are always hypermetropic; and it has been stated that it is the usual condition with the eyes of savage races. Myopia and its associated astigmatisms form between a quarter and a third of the whole of the cases; and since these represent less than one-tenth of the school population, it follows that under 3 per cent. of the children suffer from these defects. The differences in the vision of the boys and the girls, and of the natives and aliens, point to the necessity for the removal of those social conditions which are responsible, and in particular suggest a reduction of fine work in schools, the increase of air, light, and space both at school and at home, and also a more generous and equal distribution of open spaces and playgrounds. The evidence of the deterioration of astigmatic eyes indicates the desirability of a special oversight of these cases.

The Education of Defectives.—Decroly (*La Policlin*, March, April, 1909) advocates the education of defectives along manual lines, which will develop the superabundant energies of the child who lacks the possibility of intellectual development so as to make him a producer and a useful member of the community. The physician can educate the parents in personal and family hygiene, can assist in preventing the birth of defectives by advising as to marriage of persons having hereditary diseases, and can aid in improving the hygienic conditions under which the poor live. They can be taught a rational physiology and a knowledge of the intellectual and moral deficiencies of children, and how to treat them. The physician can help in developing the school system and the medical inspection of schools. Manual schools and farm schools should be established, where the teachers can individualize the children, and develop the capabilities that are found to exist in even the most defective child. Such schools, as well as those for the blind and the deaf and dumb, should be maintained by the State at the public expense. The services of the physician can be of the greatest value on the boards of management of such schools, and as examiners for entrance to them, as well as in supervising the instruction. Physicians should exert all their influence to obtain legislation to this end, and to assist in the education of the public on this subject. Another branch of useful work is in the direction of preventing the sentencing to prison of children under sixteen years of age, the establishment of children's courts, and of clinics for the treatment and instruction of children in connection with public schools.

The Principal Ways of Tuberculization in the Young Infant.—E. Terrien (*Ann. de Méd. et Chir. Inf.*, May 1, 1909) considers the various methods of entrance of tubercle bacilli into the organism of the young infant. He discards as almost negligible the theories of hereditary transmission of the germs and of the predisposition to tuberculosis. Tracheo-bronchial adenopathies are almost constant in tuberculosis in the child, and are a common location of early tuberculosis, whether it be brought from the respiratory organs or not. Still it cannot be regarded as a positive sign of pulmonary entrance of the bacilli. The ways of entrance of tuberculosis are multiple, including the bronchial, naso-pharyngeal, and intestinal mucous membranes. The intestinal method of entrance is much more rare than has been supposed, especially since milk has been sterilized habitually, and so much care taken to get it free from tubercle bacilli. It is much more important to consider the pulmonary or naso-pharyngeal entrance of germs. The principal factor is always human contagion, often in the family. To preserve the infant he must be kept from all contagion, separated from his tuberculous parents or relatives, placed in a sanatorium, if necessary, or in the country. Tuberculosis may be arrested at all stages. Latent tuberculosis progresses favorably for the infant as soon as he is removed from his surroundings to the free air and good hygiene of the country.

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TREATMENT OF CERTAIN VESICAL AFFECTIONS BY MEANS OF HYDRAULIC DISTENTION.*

BY

EDGAR GARCEAU, M. D.,

Visiting Gynecologist to St. Elizabeth's Hospital, Boston, Mass., and to the Boston Dispensary; Consulting Gynecologist to the Quincy City Hospital, Quincy, Mass;
Member of the Boston Obstetrical Society, of the Boston Society for Medical
Improvement, of the Massachusetts Medical Society, of the American
Medical Association, of the American Urological Association,
of l'Association Française d'Urologie, Paris, France,
and of the American Gynecological Association.
Boston, Mass.

(With six illustrations.)

(The experiments on animals were performed at the Laboratory for Surgical Research at the Harvard Medical School, Boston, Mass.)

THE object of this paper is to show the capacity of the bladder in certain vesical affections, to show the effect of the diminished capacity on symptomology, to show the effect of hydraulic distention in the treatment of diseased conditions. Incidentally, the anatomy of the lower end of the ureter will be discussed, and the results of experiments on animals and human cadavers, for the purpose of throwing light on the question of ureteral reflux will be detailed.

ANATOMY OF THE LOWER END OF THE URETER.

It is generally stated in books that the ureteral canal follows an oblique course through the bladder walls. In order to determine this point, I examined twenty-one cadavers. I found that the canal is not oblique through its entire course in every case. In my dissections I found that the ureteral canal, from its entrance at the posterior wall to its termination in the bladder, really consists of two distinct portions, which may be named the submucous or intravesical portion, and the vesical-wall portion. The submucous portion is situated well in the bladder proper. In many instances the submucous portion is decidedly straight, forming with the oblique or vesical-wall portion an obtuse angle, with the base or submucous portion parallel with the mucous membrane of the bladder cavity. The directions of the two portions of the canal are well shown in the accompanying photographs, which were taken from microscopic sections of recent human cadavers (Figs. 1, 2, 3, 4).

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* Thesis presented for admission to the American Gynecological Society, April, 1909.

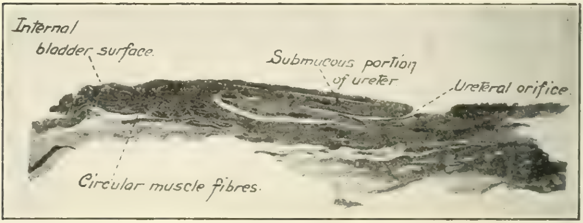

FIG. 1.—Photograph of microscopic slide. Recent cadaver. Showing submucous portion of ureter in the bladder. The canal is straight and parallel with the mucous membrane of the bladder.

In the forty-two ureters examined, the direction of the submucous portion of the canal was as follows:

No. 1......Straight.
" 2......Straight.
" 3......Straight.
" 4......Straight.
" 5......Oblique.
" 6......Oblique.
" 7......Oblique.
" 8......Oblique.
" 9......Oblique.
" 10......Oblique.
" 11......Straight.
" 12......Straight.
" 13......Straight.
" 14......Straight.
" 15......Straight.
" 16......Straight.
" 17......Straight.

No. 22......Straight.
" 23......Straight.
" 24......Straight.
" 25......Straight.
" 26......Oblique.
" 27......Straight.
" 28......Straight.
" 29......Oblique.
" 30......Straight.
" 31......Straight.
" 32......Straight.
" 33......Straight.
" 34......Straight.
" 35......Straight.
" 36......Straight.
" 37......Straight.
" 38......Straight.

No. 18	Straight.	No. 39	Straight.
“ 19	Straight.	“ 40	Straight.
“ 20	Straight.	“ 41	Straight.
“ 21	Straight.	“ 42	Straight.

Thus it will be seen that in thirty-four our of forty-two ureters the canal was straight. Only at the uppermost portion of the submucous part of the ureter, near the junction of the vesical-wall portion and the submucous portion, the tissue above the canal begins to get thicker (Fig. 3).

In the submucous portion of the ureter the canal is separated from the bladder cavity by a very thin septum of tissue, averaging, in all the recent cadavers which I examined, from one to two millimeters in thickness. This part is very yielding. In catheterizing the ureter in the living, this yielding character is sometimes very manifest, for the catheter is frequently arrested at the point where the submucous portion and the vesical-wall portion join each other.

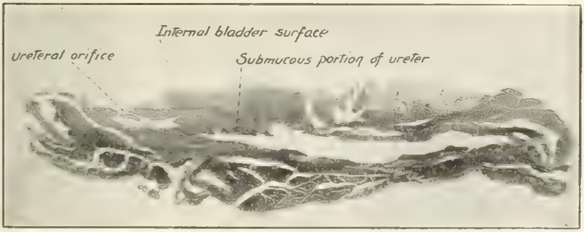

FIG. 2.—Photograph of microscopic slide. Recent cadaver. Showing submucous portion of ureteral canal. Enlarged.

The length of the submucous portion of the forty-two ureters which I examined were as follows:

No. 1	1.5 cm.	No. 22	1 cm.
“ 2	1.5 cm.	“ 23	1 cm.
“ 3	1 cm.	“ 24	.75 cm.
“ 4	1 cm.	“ 25	.75 cm.
“ 5	1.25 cm.	“ 26	1 cm.
“ 6	1.25 cm.	“ 27	1.25 cm.
“ 7	1 cm.	“ 28	1.25 cm.
“ 8	1 cm.	“ 29	.25 cm.
“ 9	1.25 cm.	“ 30	2.50 cm.
“ 10	1.25 cm.	“ 31	1 cm.
“ 11	25 cm.	“ 32	1 cm.

No.	12	.25 cm.	No.	33	2.25 cm.
"	13	1 cm.	"	34	2 cm.
"	14	1.75 cm.	"	35	1.50 cm.
"	15	1.25 cm.	"	36	.75 cm.
"	16	.25 cm.	"	37	1.50 cm.
"	17	1.50 cm.	"	38	2 cm.
"	18	1.50 cm.	"	39	1.50 cm.
"	19	1.50 cm.	"	40	.25 cm.
"	20	1.50 cm.	"	41	1.50 cm.
"	21	1 cm.	"	42	1.50 cm.

In the above table, the ureters are paired; thus Nos. 1 and 2 are in the same cadaver. It is interesting to observe the discrepancy that exists in the length of the separate ureters in the same cadaver. Thus, in Nos. 29 and 30 there is a marked difference, one being 0.25 cm. in length and the other 2.5 cm.

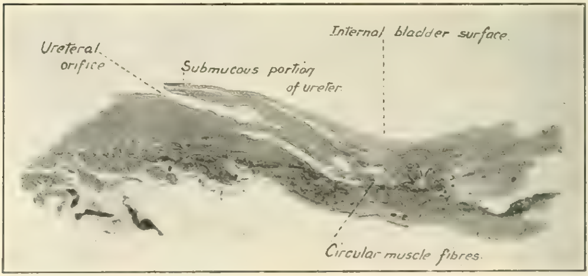

FIG. 3.—Photograph of miscroscopic slide. Recent cadaver. Submucous portion of ureter. In this case the canal begins to be somewhat oblique a short distance from the ureteral orifice.

The vesical wall portion of the canal is really the important part, both surgically and physiologically. This part of the ureter always courses through the bladder in an oblique direction. Its length was found in forty-two cases to be as follows:

No.	1	1 cm.	No.	22	1 cm
"	2	1 cm.	"	23	1 cm.
"	3	1 cm.	"	24	1 cm.
"	4	1 cm.	"	25	.50 cm.
"	5	.75 cm.	"	26	.50 cm.
"	6	1.25 cm.	"	27	1.25 cm.
"	7	1.5 cm.	"	28	1.25 cm.
"	8	1.5 cm.	"	29	1 cm.
"	9	1.25 cm.	"	30	1 cm.

No. 10	1.25 cm.	No. 31	.50 cm.
" 11	.75 cm.	" 32	.50 cm.
" 12	1 cm.	" 33	1.25 cm.
" 13	1.5 cm.	" 34	1 cm.
" 14	1.5 cm.	" 35	.75 cm.
" 15	1.5 cm.	" 36	.50 cm.
" 16	1.5 cm.	" 37	.75 cm.
" 17	1 cm.	" 38	.75 cm.
" 18	1 cm.	" 39	1.50 cm.
" 19	.75 cm.	" 40	1.25 cm.
" 20	.75 cm.	" 41	.75 cm.
" 21	1 cm.	" 42	.75 cm.

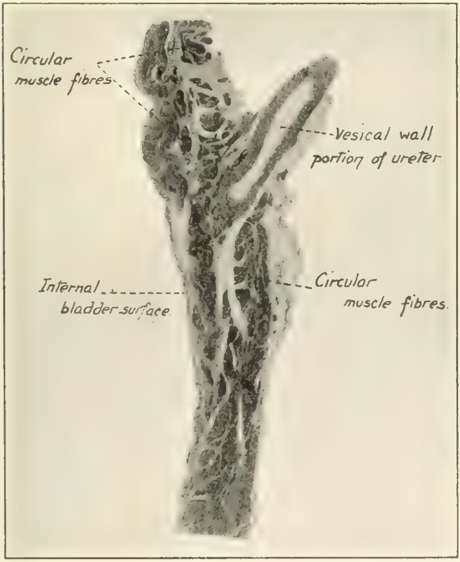

Fig. 4.—Photograph of microscopic slide. Recent cadaver. Showing the vesical wall portion of the ureter. Note the extremely oblique course through the muscular tissue. Note the well-developed circular fibers in front of and behind the ureter.

These measurements have an importance in a surgical sense for they show how dangerous an operation through the bladder on the lower part of the ureter might be, with a short ureteral canal. In all the text-books on anatomy and genitourinary diseases which I have consulted, to the number of twenty, I find the course of the ureter given as "oblique through the bladder wall." There is one exception, however, and that is Testut (*Traité d'Anatomie Humaine*, Paris, 1901, p. 585) and in his book I was glad to find that his investigations on the ureter and mine agreed in every particular. Testut says: "The ureter traverses the muscular wall in an oblique direction, and it is intimately united to its fibers. When it arrives at the internal surface of the muscular coat, it slips for a short distance between this coat and the mucous membrane of the bladder and enters into the cavity. In its last portion, the ureter is constituted solely by a fold of mucous membrane."

DISSECTION CASES.

1.—Male, thirty. Well developed, 150 pounds. Twelve hours after death. Right ureter: length of submucous portion, 1.5 cm.; length of vesical-wall portion, 1 cm. Direction of canal in submucous portion, straight. Direction of canal in vesical-wall portion, oblique. Thickness of septum between submucous portion of canal and vesical cavity, 2 millimeters. Transverse thickness of bladder wall at exit of ureter, 7 millimeters. Left ureter the same.

2.—Female, forty-five. One hundred and eighty pounds. Twelve hours after death. Right ureter: length of submucous portion, 1 cm. Length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion of canal and vesical cavity, 2 millimeters. Transverse thickness of bladder wall at exit of ureter is 5 millimeters. Left ureter the same.

3.—Male, thirty-four. One hundred and forty pounds. Twelve hours after death. Right ureter: length of submucous portion is 1.25 cm.; length of vesical-wall portion is .75 cm. Direction of canal in submucous portion is oblique. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion of canal and vesical cavity is 3 millimeters. Transverse thickness of bladder wall at exit of ureter is 6 millimeters. Left ureter is the same except that the vesical-wall portion of the ureteral canal is 1.25 cm.

4.—Male, forty. Two hundred and twenty pounds. Twenty-four hours after death. Right ureter: length of submucous portion is 1 cm.; length of vesical-wall portion is 1.5 cm. Direction of the canal in submucous portion is oblique. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion of canal and vesical cavity is 1.5 millimeters.

Transverse thickness of bladder wall at exit of ureter, 7 millimeters. Left ureter the same.

5.—Male, forty. One hundred and sixty pounds, well developed Twenty-four hours after death. Right ureter: length of vesical-wall portion is 1.25 cm. Length of submucous portion is 1.25 cm. Direction of canal in submucous portion is oblique. Direction of canal in the vesical-wall portion is oblique. Thickness of septum between submucous portion of canal and vesical cavity is 2 millimeters. Transverse thickness of bladder wall at exit of ureter is 6 millimeters. Left ureter the same.

6.—Male, forty-five. One hundred and forty pounds. Twenty-four hours after death. Right ureter: length of submucous portion, .25 cm.; length of vesical-wall portion, .75 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 6 millimeters. Left ureter, the same, except that the length of the submucous portion of the ureter is .25 cm., and length of vesical-wall portion is 1 cm.

7.—Male. One hundred and thirty-five pounds. Twenty-four hours after death. Right ureter: length of submucous portion, 1 cm. Length of vesical-wall portion, 1.5 cm. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 4 millimeters (bladder had been much stretched). Left ureter: length of submucous portion, 1.75 cm.; length of vesical-wall portion, 1.5 cm. Otherwise, the same.

8.—Male. One hundred and seventy pounds. Twelve hours after death. Right ureter: length of submucous portion, 1.25 cm.; length of vesical-wall portion, 1.50 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical-wall at exit of ureter, 7 millimeters. Left ureter: length of submucous portion is .25 cm.; length of vesical-wall portion is 1.50 cm. Otherwise the same as right.

9.—Male, twenty-six. One hundred and forty pounds. Twelve hours after death. Right ureter, length of submucous portion, 1.5 cm. Length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical-wall at exit of ureter, 4 millimeters (bladder had been stretched). Left ureter: length of submucous portion, 1.5 cm.; length of vesical-wall portion, 1 cm. Otherwise the same.

10.—Female, sixty. One hundred and forty pounds. Acute myelitis. Right ureter: length of submucous portion, 1.5 cm.;

length of vesical-wall portion, .75 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, .75 cm. Left ureter: length of submucous portion, 1.5 cm.; length of vesica-wall portion, .75 cm. Otherwise the same.

11.—Male, age (?). One hundred and eighty pounds. Recent subject. Right ureter: length of submucous portion, 1 cm.; length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is 1 cm. Left ureter: length of submucous portion, 1 cm.; length of vesical-wall portion, 1 cm. Otherwise the same.

12.—Male, thirty-five. One hundred and thirty-five pounds. Recent subject. Chronic interstitial nephritis. Right ureter: length of submucous portion, 1 cm. Length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is 1 cm. Left ureter: length of submucous portion is .75 cm.; length of vesical-wall portion, 1 cm. Otherwise the same.

13.—Female. One hundred and forty pounds. Age (?). Adult. Recent subject. Right ureter: length of submucous portion, .75 cm.; length of vesical-wall portion is .50 cm. Direction of canal in submucous portion is oblique. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is .75 cm. Left ureter: length of submucous portion, 1 cm.; length of vesical-wall portion, .50 cm. Otherwise the same.

14.—Female, sixty years. One hundred and sixty pounds. Cardiac. Recent case. Right ureter: length of submucous portion, 1.25 cm.; length of vesical-wall portion, 1.25 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is 1 cm. Left ureter: length of submucous portion, 1.25 cm.; length of vesical-wall portion, 1.25 cm. Otherwise the same.

15.—Male, thirty-five. One hundred and thirty-five pounds. Pneumonia. Recent case. Right ureter: length of submucous portion, .25 cm.; length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is oblique. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 1 cm. Left ureter:

length of submucous portion, 2.50 cm.; length of vesical-wall portion, 1 cm. Direction of canal in submucous portion is straight; direction of canal in vesical-wall portion is oblique.

16.—Female, sixty. One hundred and forty-five pounds. Cardiac. Recent case. Right ureter: length of submucous portion, 1 cm.; length of vesical-wall portion, .50 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is .50 cm. Left ureter: length of submucous portion, 1 cm.; length of vesical-wall portion is .50 cm. Otherwise the same.

17.—Female, forty-eight. One hundred and ten pounds. Exophthalmic goitre. Recent subject. Right ureter: length of submucous portion, 2.25 cm.; length of vesical-wall portion, 1.25 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 1 cm. Left ureter: length of submucous portion, 2 cm.; length of vesical-wall portion, 1 cm. Otherwise the same.

18.—Female, sixty-five. One hundred and seventy-five pounds. Apoplexy. Recent subject. Right ureter: length of submucous portion, 1.50 cm.; length of vesical-wall portion, .75 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter is 1.25 cm. Left ureter: length of submucous portion, .75 cm.; length of vesical-wall portion, .50 cm. Otherwise the same.

19.—Male, forty-five. One hundred and sixty pounds. Fracture of base of skull. Recent subject. Right ureter: length of submucous portion, 1.50 cm.; length of vesical-wall portion, .75 cm. Direction of canal in submucous portion is straight; direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 1.25 cm. Left ureter: length of submucous portion, 2 cm Length of vesical-wall portion, .75 cm. Otherwise the same.

20.—Female, sixty. One hundred and sixty pounds. Acute septicemia. Recent subject. Right ureter: length of submucous portion, 1.5 cm.; length of vesical-wall portion, 1.5 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 1.25 cm. Left ureter: length of submucous portion, .25 cm.; length of vesical-wall portion, 1.25 cm. Otherwise the same.

21.—Male, forty-five. One hundred and thirty pounds.

Cardiac. Recent Subject. Right ureter: length of submucous portion, 1.5 cm.; length of vesical-wall portion, .75 cm. Direction of canal in submucous portion is straight. Direction of canal in vesical-wall portion is oblique. Thickness of septum between submucous portion and vesical cavity is 2 millimeters. Transverse thickness of vesical wall at exit of ureter, 1.25 cm. Left ureter: length of submucous portion, 1.5 cm.; length of vesical-wall portion, .75 cm. Otherwise the same.

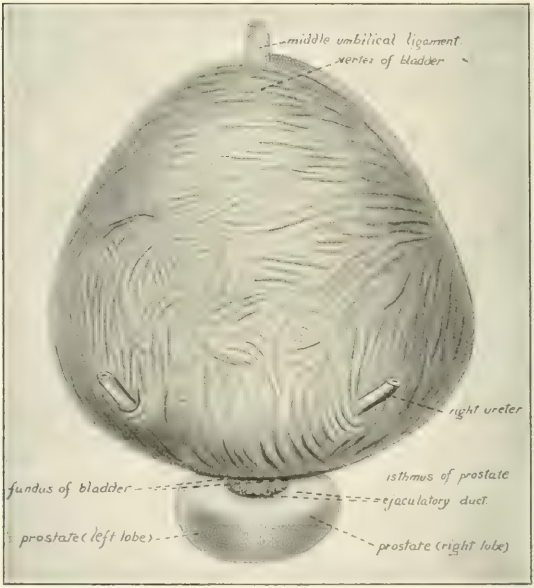

FIG. 5.—Photograph of microscopic slide. Recent cadaver. Showing middle or circular layer of muscles of the bladder. Note how the muscles coil around the ureter. Contraction of these muscles would tend to close the canal. From Sabotta (Human Anatomy, Phila., 1906. II. p. 122. Fig. 479).

THE MUSCLES OF THE URETER.

The musculature of the ureter, according to Sabotta (*Human Anatomy*, Phil., 1906, vol. ii, p. 123) is independent of that of the bladder. The muscles of the ureter extend down in a longitudinal direction and enter the muscular layers of the bladder and become lost in the muscles of the trigone. According to Kalischer (*Urogenital Muskulatur des Dammes*, Berlin, 1901, p. 151), the musculature of the trigone is not related with the transverse or middle layer of the muscles of the ureter and with the circular muscles of the urethra.

Hallé (*Urétérites et Pyélites*, Paris, 1887, p. 29) agrees in the main with Kalischer. Hallé states that the long ureteral muscle fibers are quite distinct from the muscle fibers of the bladder, and he maintains that they are separated from one another by connective tissue.

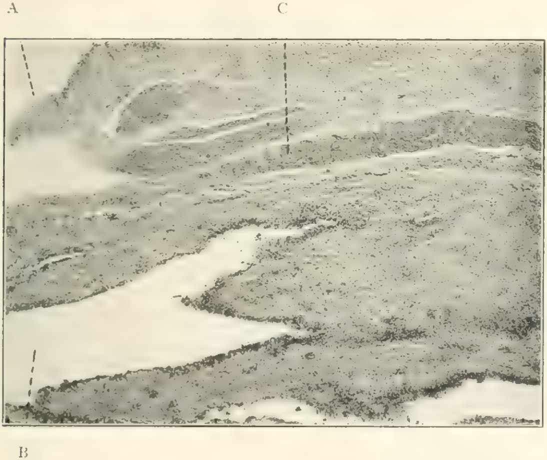

FIG. 6.—Photograph of microscopic slide. Recent cadaver. The longitudinal muscles of the ureter which help to open the orifice. A, Internal bladder surface. B, Ureteral orifice. C, Longitudinal muscle.

The muscles of the bladder wall proper are of three kinds: the longitudinal or external, poorly developed; the middle or circular which are well developed and strong; and there is likewise an internal longitudinal layer which is less developed than the other two.

I wish to call particular attention to the muscles of the bladder along the course of the vesical-wall portion of the ureter. A glance at Fig. 5, taken from Sabotta (*Human Anatomy*, Phila., 1906, p. 122, Fig. 479), shows very well how circular bands of muscle curl around the ureter just below the point of exit from the bladder. It is easy to understand how contraction of these fibers would close the canal. I have found in my dissections somewhat similar circular fibers situated *directly in front of the ureter* as it courses through the vesical-wall portion. Both the posterior and the anterior circular fibers are well pictured in Figs. 3 and 4, which are photographs of mounted specimens of human bladders. It is easy to see how contraction of these two sets of muscles would firmly close the ureteral canal.

The muscles of the ureteral orifice are of two kinds, those which close the orifice and those which open it. The muscles which close the orifice are the longitudinal muscles which are continued from the sides of the ureter down into the trigone. Longitudinal fibers obliquely placed, running into the trigone, open the orifice. These are seen in Fig. 6.

MECHANISM OF CLOSURE OF THE CANAL.

Much stress has been laid upon the fact that distention of the bladder exerts pressure on the ureteral canal as it courses through the bladder walls, and so prevents reflux. The greater the pressure, the less the chance of reflux. This is undoubtedly the main factor in preventing reflux, because in experimenting with sixteen cadavers under conditions in which muscular contraction could be eliminated, reflux was, in my experiments, absent with but a single exception, and in this case the orifice of the ureter was diseased. Young (*Johns Hopkins Hospital Bulletin*, 1898, lxxxvii, 105) in two cadavers likewise failed to get reflux. Young's experiments were the only ones I could find in the literature. In both my own and in Young's experiments, fluid was forced into the bladder under great pressure.

I believe that the action of the circular muscles, already described, must also have a large part in preventing reflux, and this view is also taken by Guyon (*Mal. des Voies Urinaires*, Paris, 1896, p. 445) who called attention to the posterior circular muscles and commented on their action in preventing reflux. In his experiments on animals, reflux always occurred when these posterior fibers were cut.

As to which portion of the ureteral canal is of more importance with reference to reflux, the submucous or the vesical-wall portion, I cannot definitely say. In some of my dissections the submucous portion was very short (.25 cm.), and it is hard for me to see how such a short canal can be reckoned with in preventing fluids from regurgitating. Again, those who use the cystoscope can testify to the frequent patency, in life, of the ureteral orifice, even with the bladder filled with liquid. The submucous portion is a lax canal, and this is sometimes plainly manifested on passing a ureteral catheter. On the other hand, with a long submucous portion it is easy to see how internal vesical pressure would approximate the two walls of the ureter and so prevent reflux. With the vesical-wall portion of the ureter it is different. Here we have a tube coursing obliquely in a wall which is fairly rigid, with muscular tissue in front and behind it. Internal vesical pressure must tend to close it. In some of the cadavers which I examined, I passed a probe into the ureter from above, the bladder having been removed from the body and greatly distended with fluid. In all the cadavers which I examined in this way, to the number of five, there was a definite obstacle to the passage of the probe exactly at the point where the ureter courses through the vesical wall. So that it was evident to my mind that the vesical-wall portion of the ureter played a very important part in preventing reflux, even in the cadaver. In life it is reasonable to suppose that the muscles aid toward this end, especially when the bladder is full and there is resulting spasm and presumably muscular action.

REFLUX OF FLUIDS FROM THE BLADDER INTO THE URETER AND RUPTURE OF THE BLADDER.

Reflux in Animals.

Under normal conditions, it is probable that reflux of fluids into the ureter never takes place. In conditions of disease, however, fluids enter with ease. We have at present to do with reflux in conditions of health.

In order to determine the question of ureteral reflux, I experimented upon sixteen dogs.

The technic was simple. The dogs were first etherized and the abdomen was opened by longitudinal and transverse incisions, thus exposing the field. The ureters were then dissected from beneath the peritoneum and cut close to the kidney and the free ends laid upon white gauze at the side of the animal. A catheter was then passed into the urethra and reflux from the bladder was prevented by ligaturing the urethra around the catheter. A solution of methylene blue was then injected into the bladder by means of a fountain syringe. Reflux was easy to observe for the blue at once stained the white gauze. The dogs were full grown and averaged from twelve to thirty pounds in weight.

The dogs were divided into two groups of eight each; in the first group the injection was made rapidly under great pressure at 14 feet elevation; in the second group the injection was made at a gradually increasing elevation of 2, 5, 9, and 14 feet, with a pause of three minutes at each elevation.

With rapid distention of the bladder in the first group of eight dogs, reflux was observed six times, on one side or the other, in the sixteen ureters at an elevation of 14 feet.

With gradual distention, that is, at 2, 5, 9, and 14 feet, respectively, progressing from the low elevation to the high, reflux was observed as follows:

One at 14 feet,
One at 9 feet,
Six at 5 feet,
Three at 2 feet.

In the remaining five ureters there was no reflux. The time elapsing from the beginning of the experiment until the reflux was observed varied from thirty seconds to twelve minutes. The fountain syringe was allowed to remain at each elevation for three minutes. There were thus eleven refluxes in sixteen ureters.

It is interesting to observe that in the sixteen ureters in which distention was gradual, there were only five in which no reflux occurred, while in the other sixteen ureters in which rapid distention was done, there were ten in which no reflux was observed.

Guyon and Coutade (*Bul. Méd.*, Paris, 1894, x, 651) found the following results: Experimenting with thirty-two rabbits they got reflux twenty times. They note that when the bladder was in a state of contraction, reflux was more apt to occur. When the bladder was inert and easily distended, this reflux was less apt to occur. In the dog they got reflux five times in thirty-two cases. They concluded that reflux *never* occurred when the bladder offered no resistance, even when very much distended, and they also concluded that when the bladder was in a state of contraction, reflux was possible. This contraction was measured by 1.5 cm. of mercury in the rabbit and 5 cm. in the dog. These same authors (quoted by F. Guyon, *Leçons Cliniques des Mal. des Voies Urin.*, Paris, 1894, ii, 447) speak of the well-developed muscles which are found behind the ureter as it courses through the bladder wall. They found these fibers well developed in dogs, and they believe that the contraction of these muscles serves in a great measure to prevent reflux of fluid. They found that when these fibers were cut, reflux was constant,

F. Guyon (*Leçons Clin. sur les Mal. des Voies Urin.*, Paris. 1894, i, 83) injected antiseptically into the bladders of various animals, vegetable charcoal in suspension. The urethra was then occluded. Charcoal was always found in the pelvis of the kidney within 48 hours. Under these circumstances, however, a different mechanism is brought into play.

Sampson (*Johns Hopkins Hospital Bulletin*, 1903, xiv, 343) has experimented with sixteen dogs. He cut the ureter and implanted it in the bladder (seven dogs). Later he injected a colored solution into the bladder, and no reflux was found to occur, either in the ureter which had been implanted or into the opposite one.

H. H. Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 104) experimented on a small dog with an elevation of 14 feet of water. No reflux occurred.

Lewin and Goldschmidt (*Virch. Archiv.*, 1893, cxxxiv, 48) found reflux both by injecting under pressure and by artificial retention. It always occurred in bladders not greatly distended and still capable of contraction. The number of times is not stated in the article. The authors also found that when the pressure was exerted just after a peristaltic wave in the ureter had reached the bladder, reflux was apt to occur. They noticed this several times (*loc. cit.*, p. 54). The writers used forty animals, but no special statistics are given.

If we may generalize, we may say that reflux is not so apt to occur in animals when the bladder is distended rapidly as when it is distended gradually.

REFLUX IN HUMAN BEINGS.

I have experimented with sixteen cadavers for the purpose of investigating the question of reflux. The technic was simple. Milk or water was forced into the bladder with a Davidson's syringe at a pressure of 3 pounds to the square inch, measured by means of a simple water-gauge. This pressure was kept up for ten minutes in each case. In thirty-one of the ureters there was no reflux; in one only was there reflux, and in this case the ureteral canal from the entrance to the exit into the bladder was diseased. It was very easy to watch the ureters. They were cut a short distance above the entrance to the bladder and carefully observed during the distention. After watching the ureter for ten minutes the bladder was forcibly distended at a pressure varying from 7 to 10 pounds until it burst. In none of the bladders, with the one exception, was there reflux even under this great pressure. In about half the cadavers the bladder and ureters were removed from the body before the experiment began. This made no difference in the results.

Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 104) experimented with a cadaver of a male adult. He injected 1,700 c.c. at an elevation of 14 feet. There was no reflux. In another cadaver a similar result was obtained. These experiments are the only ones besides my own that have been performed on human cadavers.

Judging from my experiments on cadavers and from my clinical work, I should say that reflux never occurs in life if the orifices are normal. I have performed dilatation of the bladder many times and I have never seen any ill effects following it, with but three exceptions. The first case was evidently unsuited for this treatment: the patient had a "golf-hole" ureter, and reflux was certain to occur. In this case the bladder was very much contracted and there was a stricture of the ureter. I thought I might, by dilating the bladder, do a ureteral resection later, and I was willing to take the risk of dilatation with this in view. She had a severe colic. In the other two cases there was a very slight hemorrhage following the dilatation, which soon subsided.

I do not believe that even if reflux did take place much harm would result, even if the fluid were germ-laden. The kidney is constantly secreting germs which do not prove to be harmful provided the mucous membrane of the urinary tract is intact. Reflux, of course, occurs sooner or later when there is retention of urine in the bladder due to obstruction. If the urine is germ-laden, infection of the upper passages is certain. But this is an entirely different problem, for here we have continued disturbances in circulation which favor easy infection. It seems to me that the evidence is in favor of the innocuousness of dilatation. If we dilate rapidly, the danger of reflux will be much lessened.

RUPTURE IN ANIMALS.

In order to determine the rupture-point of the bladder, I experimented on sixteen dogs.

The dogs were divided into two groups. In the first group of eight dogs, the bladder was distended gradually at a progressive elevation of 2, 5, 9, and 14 feet. The elevations were for three minutes each. Three bladders ruptured at an elevation of 5 feet, one at 9, three at 14, and in one remaining dog no rupture occurred at 14 feet elevation, but there was a general ooze which came through the peritoneal surface of the bladder. The internal coats were ruptured and the fluid oozed through the peritoneum.

In the other eight dogs, with an elevation of 14 feet from the outset, rupture occurred without exception at a time varying from thirty seconds to two minutes. Males held more than females. One male bladder ruptured at 14 feet with a capacity of 1,200 c.c. In most of the cases the bladder held from 300 to 350 c.c. before bursting. In every case the rent was on the posterior wall and was longitudinal, and from 1 to 4 inches in length.

James (*Edinburgh Medical Journal*, 1878 xxiv, 408) experimented with sixteen sheep. All these bladders were ruptured at an elevation varying from 3 1/2 to 9 feet. The time varied from one minute to eighty minutes. The amount of fluid contained varied from 900 c.c. to 2,000 c.c.

James, in commenting on these results, says that the greater the pressure, the more rapidly the bladder will burst and the smaller the amount of water required. In James' experiments, the bladder burst near the neck.

James' article was a very good one. He called attention (*loc. cit.*, p. 299) to the fact that the strength of the bladder is measured by the diameter. If this is doubled, the strength will be halved; that is, the more the bladder is stretched, the less the wall will be able to withstand internal pressure. James also called attention to the fact that there are really two points to be considered in determining the question of rupture. A bladder which is stretched at once bursts at a certain pressure, whereas one which is stretched gradually and slowly bursts at another pressure. The latter is called proof tenacity, and the former ultimate tenacity. For clinical purposes, the ultimate tenacity is the only one which need be considered.

RUPTURE IN HUMAN BEINGS.

In the sixteen human bladders with which I experimented there were seven females and nine males. The bladders were injected at a pressure of from three to four pounds for a period of ten minutes. In no instance did rupture occur. The amounts held during this time varied from 500 c.c. to 1,500 c.c., females holding quite as much as males. Then the bladders were rapidly injected until they burst. The amounts held when the bursting took place is as follows:

Females.	Males.
1000 c.c.	1000 c.c.
1200 c.c.	1210 c.c.
1100 c.c.	1710 c.c.
1800 c.c.	1500 c.c.
750 c.c.	1200 c.c.
800 c.c.	1100 c.c.
1800 c.c.	900 c.c.
	1800 c.c.
	1000 c.c.

The point of rupture, its extent and nature, is indicated in the following table:

1. Anterior superior; pinhole; complete.
2. Anterior superior; pinhole; complete.
3. Anterior superior; large rent; complete.
4. Posterior superior, left; large rent; incomplete; inner and middle coats only. Ooze through peritoneum.
5. Anterior lateral, right; 2 cm. in length; complete.
6. Vertex, anteroposterior; 2 cm.; complete.
7. Anterior superior, right; pinhole; complete.
8. Left anterior wall, longitudinal; incomplete; middle and inner coats only. Ooze through peritoneum.
9. Anterior left lateral, longitudinal; incomplete. Middle and inner coats only, 2 cm. Ooze through peritoneum.
10. Anterior right lateral; incomplete. Middle and inner coats only, 2 cm. Ooze through peritoneum.
11. Anterior right lateral; incomplete. Middle and inner coats only, 2 cm. Ooze through peritoneum.
12. Midline posterior wall; middle and inner coats only, 1 cm. Rent below reflection of peritoneum. Ooze in cellular tissue.
13. Anterior upper left wall, 2 cm. Incomplete.
14. Anterior left wall; incomplete; middle and inner coats only, 2 cm. Ooze through peritoneum.
15. Anterior upper right wall, 2 cm.; complete.
16. Anterior lateral upper left wall, longitudinal, 2 cm.; complete.

It will thus be seen that complete rupture occurred nine times, and incomplete, seven times. The rents were, as a rule, small, not over 2 or 3 cm. long. The tear was always jagged and never clear cut.

James experimented with twenty human bladders, but his results are not well tabulated; his technic was also imperfect. Instead of injecting water directly into the bladder, he removed it and put into it a rubber balloon which was injected underneath the bladder walls. Nevertheless, his experiments are interesting: In one case (*loc. cit.*, p. 409) that of a strong boy, with a head of water of 6 feet, the bladder did not burst for seventy-two hours. At the end of that time it contained 480 c.c. It burst at once with a head of 10 feet of water with the same capacity. In another case, that of a strong male, thirty-four years old, the bladder took 1,500 c.c. at once. At a pressure of 4 1/2 feet of water it burst at the end of sixty hours, and its capacity was 2,040 c.c.

Delbet (*Anat. Chir. de la Vesie*, Paris, 1895, p. 7) quotes Bouley (*Thèse de Paris*, 1883, p. 101) who ruptured a human bladder in a cadaver at 1,300 c.c. The same author quotes Duchastelet (*Thèse de Paris*, 1886, p. 24) who ruptured bladders in cadavers with a capacity of from 1,000 to 1,600 c.c. Delbet himself (*loc. cit.*, p. 8) did experiments likewise on cadavers and ruptured the bladders with 1,400 to 2,200 c.c.

Kausch (*Arch. f. klin. Chir.*, Berlin, 1907, lxxxiii, 81), in commenting on the danger of rupturing the bladder, is able to state that no case has been found in literature of rupture of the bladder following dilatation.

Skene (*Diseases of Women*, New York, 1889, p. 752), however speaks of the case of a woman who had long-continued cystitis. She had a habit of wearing a catheter at night. After many years of suffering, dilatation was tried. After the first and only injection, severe pain, collapse, and death followed. At the autopsy a perforation was found at the site where the catheter had lain so many years. The catheter had eroded the bladder. This is the only case of rupture I have been able to find in literature.

I think that if care is used and if the elevation of the water is not too great, there is no danger of bursting the human bladder in life. A safe index of the amount of fluid the patient can stand is, I believe, the sensation of the patient.

Some prefer to use pressure of a head of water. This gives uniform results and the pressure can be regulated. A head of water from 4 to 6 feet is, I am convinced from my experiments, perfectly safe. Under these circumstances, the amount of pressure used is not more than from two to three pounds per square inch. I have exerted this amount of pressure on sixteen cadavers without ill results. On a delicate boy, eighteen years, who died from progressive muscular atrophy, a pressure of three pounds per square inch, equal to a head of water 6 feet high, was successfully withstood. It required a pressure of ten pounds per square inch to rupture the bladder; this equals a head of water 20 feet high. Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 107) was also able to get excellent results in dilatation with a head of water 4 feet high. With this head of water, one can do all that is necessary.

EXPERIMENTS TO DETERMINE THE RUPTURE-POINT AND REFLUX IN ANIMALS.

(I think it is not reasonable to draw any positive conclusions from experiments on dogs, with reference to the rupture-point and reflux. The bladders in these little animals are very delicate, far more delicate than those in human beings, and it is astonishing that they could stand as much pressure as they did.)

Experiments to Determine Rupture and Reflux in Animals.

Dog No. 1.—Twenty-five pounds, well-built male. Gradually increasing pressure, 2, 5, 9, 14, feet. Ruptured in 7 minutes; posterior surface of the bladder, longitudinal, 3 inches, 1,200 c.c. No reflux on the left. Reflux on the right.

Dog No. 2.—Twenty-five pounds, female. Gradually increasing pressure, 2 feet. Rupture in six minutes. Rent in summit of the bladder, 550 c.c. Reflux on right side. Reflux on left side.

Dog No. 3.—Fifteen pounds, female. Gradually increasing pressure. General ooze at 5 feet, from the posterior wall of the bladder, 350 c.c. Reflux on right side at 2 feet in three minutes. Reflux on left at 5 feet in four minutes.

Dog No. 4.—Thirteen pounds, female. Gradually increasing pressure. General ooze from the posterior wall at 5 feet, 350 c.c. Reflux on the left at 5 feet. Reflux on the right at 5 feet.

Dog No. 5.—Twenty pounds, female. Gradually increasing pressure. General ooze at 5 feet. No rupture, 500 c.c. No reflux on left at 14 feet. No reflux on right at 14 feet.

Dog No. 6.—Twenty-two pounds, female. Gradually increasing pressure. General ooze at 5 feet. Ruptured at 14 feet, 700 c.c. Reflux on the right at 2 feet. Reflux on the left at 2 feet.

Dog No. 7.—Thirty pounds, female. Gradually increasing pressure. General ooze at 5 feet. Ruptured at 9 feet. Rent longitudinal on posterior wall, 2 inches, 600 c.c. No reflux on left. No reflux on right.

Dog No. 8.—Ten pounds, male. Gradually increasing pressure. Ruptured at 14 feet. Rent in the posterior wall, longitudinal, 3 inches, 300 c.c. Reflux on left at 5 feet. Reflux on right at 9 feet.

Dog No. 9.—Twelve pounds, female. Rapid pressure at 14 feet. Ruptured in 3 seconds. Posterior wall, longitudinal, 3 inches, 350 c.c. Reflux on right. Reflux on left.

Dog No. 10.—Fifteen pounds, female. Rapid pressure at 14 feet. Ruptured in 30 seconds. Posterior surface, longitudinal, 3 inches, 650 c.c. Reflux on the left. Reflux on the right.

Dog No. 11.—Twenty pounds, female. Rapid distention. Ruptured in 30 seconds. Posterior wall, longitudinal, 3 inches, 250 c.c. No reflux on right. No reflux on left.

Dog No. 12.—Twenty pounds, female. Rapid distention, 14 feet. Ruptured in thirty seconds, posterior wall, longitudinal, 3 inches, 400 c.c. Reflux on left. Reflux on right.

Dog No. 13.—Fifteen pounds, male. Rapid distention. Ruptured in ten seconds. Posterior wall, longitudinal, 2 inches, 300 c.c. No reflux on left. No reflux on right.

Dog No. 14.—Twelve pounds, male. Rapid distention at 14 feet. Ruptured in ten seconds. Posterior wall, longitudinal, 2 inches, 350 c.c. No reflux on left. No reflux on right.

Dog No. 15.—Twenty-two pounds, female. Rapid distention at 14 feet. Ooze at the end of 1 minute. Ruptured at the end of 2 minutes. Posterior wall, longitudinal, 2 inches, 850 c.c. No reflux on left. No reflux on right.

Dog No. 16.—Seven pounds, female. Rapid distention. Ruptured in 10 seconds, posterior wall, longitudinal, 3 inches, 200 c.c. No reflux on left. No reflux on right.

EXPERIMENTS TO DETERMINE RUPTURE AND REFLUX IN HUMAN BEINGS.

I performed the following experiments upon sixteen cadavers for the purpose of determining the rupture-point of the bladder:

1.—Male, eighteen. Emaciated. Progressive muscular atrophy. Three pounds' pressure for ten minutes; no rupture. Ten pounds' pressure (20 feet of water); rupture two minutes later. Pinhole opening in the anterior superior part of the bladder. Amount injected, 1,000 c.c. No reflux on either side.

2.—Male, thirty-four. Emaciated. Purulent meningitis. Three pounds' pressure for 10 minutes; no rupture. Eight pounds' pressure for two minutes; rupture. Pinhole opening in the anterior superior part of the bladder. Amount injected, 1,210 c.c. No reflux on either side.

3.—Male, twenty-eight. Robust. Accidental death. Three pounds' pressure for ten minutes; no rupture. Ten pounds' pressure; rupture three minutes later. Large rent in the anterior superior part of the bladder. Amount injected, 1,710 c.c. (600 c.c. injected without rupture at 3 pounds' pressure). No reflux on either side.

4.—Male, twenty-nine. Accidental death (broken neck). Two pounds' pressure ten minutes; no rupture. Eight pounds' pressure; rupture five minutes later. Large rent in posterior superior left part of bladder. Rupture involved inner and middle coats and not peritoneal at all. Ooze through peritoneal. Amount injected, 1,500 c.c. (Amount injected without rupture, 660 c.c., at three pounds' pressure.) No reflux either side at three and five pounds; reflux in left at eight pounds, one or two drops. On opening the bladder it was found that the left ureteral orifice was patulous and that the canal was also patulous. Much injection of eminence. Evidence of ureteritis. Remarks: left ureteral canal diseased, hence reflux.

5.—Female, sixty. Myelitis. Three pounds' pressure, ten minutes; no rupture. Ten pounds' pressure; rupture three minutes later. Rent in anterior lateral wall, 2 cm. Amount injected, 1,000 cm. Amount injected without rupture, 800 cm. at three pounds pressure. No reflux either side at three pounds. No reflux from either side at ten pounds.

6.—Male, age (?). One hundred and eighty pounds. Four pounds' pressure, ten minutes; no rupture. Ten pounds' pressure; rupture four minutes later. Rent in vertex, anteroposterior, 2 cm. Amount injected, 1,100 cm. Amount injected without rupture at four pounds, 900 c.c. No reflux either side at four pounds. No reflux either side at ten pounds.

7.—Male, thirty-five. Chronic interstital nephritis. Three pounds' pressure, fifteen minutes; no rupture. Eight pounds' pressure; rupture three minutes later. Pinhole rent in anterior upper wall to the right. Amount injected, 1,200 c.c.; at three pounds, 1,050 c.c. No reflux either side at three pounds. No reflux either side at eight pounds.

8.—Female. Adult. Three pounds pressure, ten minutes; no rupture. Ten pounds' pressure; rupture one minute later. Rent in left anterior wall, involving middle and inner coats. No peritoneal rent. Ooze through peritoneum. Amount injected 1,200 c.c. Amount injected at three pounds, 1,110 c.c. No reflux at three pounds. No reflux at ten pounds.

9.—Female, sixty. Cardiac. Four pounds' pressure, ten minutes; no rupture. Ten pounds' pressure; rupture one minute later. Rent in anterior left lateral wall, middle and inner coats only, 2 cm. Ooze through peritoneum. Amount injected, 1,100 c.c. Amount injected at four pounds, 900 c.c. No reflux at four pounds. No reflux at ten pounds.

10.—Male, thirty-five. Pneumonia. Four pounds' pressure ten minutes; no rupture. Ten pounds' pressure, rupture two minutes later. Rent 2 cm. long in anterior right lateral wall. Incomplete. Ooze through peritoneum. Amount injected, 1,100 c.c. Amount injected at four pounds, 600 c.c. No reflux either side at four pounds. No reflux either side at ten pounds.

11.—Female, sixty. Cardiac. Four pounds' pressure; ten minutes; no rupture. Seven pounds' pressure; rupture three minutes later. Rent in upper right lateral wall, small, incomplete. Ooze through peritoneum. Amount injected, 1,800 c.c. Amount injected without rupture, 1,500 c.c. at four pounds' pressure. No reflux either side at four pounds. No reflux either side at seven pounds.

12.—Female, forty-eight. Exophthalmic goitre. Four pounds' pressure, ten minutes; no rupture. Eight pounds' pressure; rupture a few seconds later. Rent in posterior wall, midline, 1 cm. Rent was below the peritoneal reflection and there was oozing in the cellular tissue. Amount injected, 750 c.c. Amount injected without rupture, 500 c.c. at four pounds. No reflux either side at four pounds. No reflux either side at eight pounds.

13.—Female, sixty-five. Apoplexy. Three pounds' pressure, ten minutes; no rupture. Eight pounds' pressure; rupture three minutes later. Rent in anterior wall to left, high up, 2 cm. Amount injected, 800 c.c. Amount injected without rupture, 600 c.c. at three pounds' pressure. No reflux either side at three pounds. No reflux either side at eight pounds.

14.—Male, forty-five. Fracture of base of skull. Three pounds' pressure, ten minutes; no rupture. Eight pounds' pressure; rupture two minutes later. Rent in anterior left wall high up, 2 cm. Incomplete. Ooze through peritoneum. Amount injected, 1,800 c.c. Amount injected without rupture, 1,500 c.c. at three pounds' pressure. No reflux at three pounds. No reflux at eight pounds.

15.—Female, sixty. Acute septicemia. Three pounds' pressure, ten minutes; no rupture. Eight pounds' pressure, rupture three minutes later. Rent anterior lateral wall, 2 cm. Amount injected, 1,800 c.c. Amount injected without rupture, 1,200 c.c. at three pounds' pressure. No reflux either side at three pounds. No reflux either side at eight pounds.

16.—Male, forty-five. Cardiac. Four pounds' pressure, ten minutes; no rupture. Eight pounds' pressure; rupture four minutes later. Rent anterior lateral wall, left, 2 cm. Longitudinal. Amount injected, 900 c.c. Amount injected without rupture, 700 c.c. at four pounds' pressure. No reflux either side at four pounds. No reflux either side at eight pounds.

THE TREATMENT OF CERTAIN VESICAL AFFECTIONS BY HYDRAULIC DISTENTION; AND CAPACITY OF THE BLADDER IN HEALTH AND DISEASE.

Technic.

As a preliminary to this treatment, cystoscopy should always be performed.

To dilate the bladder, the patient may be placed in the dorsal position or, as Sinclair (*Medical Chronicle*, Manchester, 1894, ii, N. S. 83) advises, the side position. I think the latter an excellent one, because, by using it, the pressure of the abdominal contents is avoided. The bladder is first emptied and washed out with a 2 per cent. solution of boric acid; then about 3 drams of a 5 per cent. solution of cocaine are injected into the bladder and urethra and left there for three minutes. The cocaine is then washed out. A fairly firm rubber catheter of large bore is then passed into the bladder, and with a Davidson syringe a 2 per cent. solution of boric acid is forced into the bladder rather quickly. Reflux through the urethra along the catheter may be prevented by inserting the finger into the vagina at the side of the catheter in the vicinity of the vesical neck and making fairly firm pressure against it. When the patient begins to complain of pain, the injection should cease temporarily. When the bladder has accustomed itself to the fluid within it, the pain ceases and another syringeful may be forced in. This may be repeated at intervals of half a minute or so until the patient declares that she can stand no more. Usually she will endure the treatment five minutes.

Pressure with a syringe is intermittent, at least in cadavers, for I found that after a syringeful of liquid had been injected there was an immediate rise, as registered by a water gauge; after a brief pause, the pressure dropped almost to zero. I suppose this is due to the elasticity of the walls which allows of accommodation by expansion. With steady pressure by a column of water the pressure is continuous, and many prefer this method of dilating. The technic is simple, all that is required being a fountain syringe and a catheter. A head of water from 4 to 6 feet is safe.

A modification of the technic is proposed by Janet (*Ann. des Mal. des Org. Gén.-Urin.*, Paris, 1895, xiii, 138). Janet dilates the bladder to its utmost, and the patient is desired to hold the water as long as possible.

The treatment should be given at intervals of 3 or 4 days, but in a bad case it might be advisable to give the treatment every day at first. Dilatation should not be done in a bladder in which there is a "golf-hole" ureter, one in which there are deep ulcers or in which there are deep loculi. Frequent cystoscopic examination of the bladder should be made in order to see that no harm is being done. With this precaution, the treatment is devoid of danger. Occasionally, after long treatment of two or three months, there may be some tendency to loculation of the bladder between the muscle fasciculi. This takes place usually on the sides of the bladder. In bladders contracted by disease this loculation does not occur. When it does happen it has no significance.

PERSONAL CASES.

Incontinence.

1.—Female, twenty-six. Duration ten years. Bladder normal in every way. Diagnosis: incontinence, retroflexion. Capacity without cocaine, 180 c.c.; with cocaine, 360 c.c. Dilated three times up to 360 c.c. Result, no benefit.

Neurasthenia.

2.—Female, twenty-five. Duration six months. Urination twelve times a day, twice at night. No bladder lesions. Diagnosis: neurasthenia. Capacity without cocaine, 480 c.c.; with cocaine, 660 c.c. Dilated six times at intervals of four days up to 810 c.c. At the end of this time she was perfectly well with reference to her bladder symptoms. Urination three times a day; none at night.

Vesical Hyperemia.

3.—Female, forty-two. Duration one year. Vesical neck and trigone very much reddened. Hyperemia of the vesical neck and trigone, also of the posterior wall of the bladder. Lacerated cervix and perineum and prolapse. Capacity without cocaine, 450 c.c.; with cocaine, 540 c.c. A recent case.

4.—Female, forty-six. Duration four years. Urination twelve times a day, two or three times at night. Intense redness of the vesical neck and trigone. Right floating kidney. Lacerated cervix and perineum, retroversion, endometritis. Separation of the recti. Capacity without cocaine, 240 c.c.; with cocaine, 480 c.c. Dilated seven times at intervals of four days up to 540 c.c. Patient very comfortable. Urination five or six times a day, not at all at night.

5.—Female, twenty-seven. Duration 4 years. Urination eight times a day, five times at night. Intense redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone, lacerated cervix and perineum, left salpingitis. Capacity without cocaine, 480 c.c.; with cocaine, 570 c.c. Dilated only once. Disappeared.

6.—Female, thirty-six. Duration six weeks. Intense redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and triogne, lacerated cervix and perineum. Capacity without cocaine, 420 c.c. No dilatation. Disappeared.

7.—Female, forty-nine. Duration two years. Urination twenty to thirty times a day. Once at night. A few patches of redness on the posterior wall. Intense redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone and of the bladder, anteflexion. Capacity without cocaine, 300 c.c.; with cocailine, 360 c.c. Dated six times at intervals of four days up to 750 c.c. Result, well. Urinates four times a day; not at all at night. Great relief.

8.—Female, thirty-seven. Duration seven years. Urination six times a day, eight times at night. Intervals when she urinated less frequently. Intense congestion of the trigone and vesical neck. Diagnosis: hyperemia of the vesical neck and trigone and of the bladder, double salpingitis. Capacity without cocaine, 720 c.c.; with cocaine, 780 c.c. Dilated three times at intervals of four days up to 810 c.c. Great improvement. Urinates six times a day; not at all at night. Feels very much better.

7.—Female, forty-two. Always had irritable bladder from childhood. Urination twelve times a day, three times by night. Intense redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone, retroversion. Capacity without cocaine, 180 c.c. No dilatation. In this case the bladder was small from childhood. Never could hold urine very long.

10.—Female, thirty-nine. Duration one year. Urination six to twelve times a day, two to four times at night. Slight redness of the vesical neck and trigone. Double pyelitis, chronic metritis. Capacity without cocaine, 240 c.c.; with cocaine, 300 c.c. No dilatation.

11.—Female, forty-six. Duration six weeks. Urinates ten times by day, once at night. Redness of the vesical neck and trigone, and bladder wall. Diagnosis: hyperemia of the vesical neck and trigone, anteflexion. Capacity without cocaine, 360 c.c.; with cocaine, 480 c.c. Dilated four times at intervals of one week up to 500 c.c. Urination three or four times a day, not at all at night.

12.—Female, forty-three. Duration one year. Urination fifteen times a day, twice at night. Redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone. Capacity without cocaine, 400 c.c. Dilated twice up to 600 c.c. Much better, urination six times a day, twice at night. Less irritability.

13.—Female, twenty-three. Duration twenty years, at intervals. Urination twelve times by day, total incontinence by night. Redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone, incontinence, occasional retention (probably hysterical). Capacity without cocaine, 480 c.c.; with cocaine, 570 c.c. Recent case.

14.—Female, thirty-five. Duration one month. Urinates six times by day, twice by night. Redness of the vesical neck and trigone. Two large patches on the posterior wall. Diagnosis: hyperemia of the vesical neck and trigone and posterior wall, right salpingitis. Capacity without cocaine, 150 c.c.; with cocaine, 240 c.c. No dilatation. Disappeared.

15.—Female, forty. Frequent urination for fifteen years. Redness of the vesical neck and trigone. Diagnosis: hyperemia of the vesical neck and trigone, lacerated cervix and perineum, rectocele, prolapse. Capacity without cocaine, 480 c.c.. Recent case.

Acute Cystitis.

16.—Female, sixty-five. Duration two months. Urinates twenty to thirty times a day, four times at night. (No cystoscopy). Diagnosis: acute cystitis. Capacity without cocaine, 240 c.c.

17.—Female, forty-one. Duration six weeks. Urination ten to twenty times a day, four or five times at night. (No cystoscopy.) Diagnosis: acute cystitis, appendiceal abscess, salpingitis. Capacity without cocaine, 270 c.c.; with cocaine, 330 c.c. Recent case.

Chronic Nontubercular Cystitis.

18.—Female, thirty-nine. Duration eight months. Urinates twelve times a day, once or twice at night. Patches of redness on the bladder wall. Diagnosis: chronic cystitis, right floating kidney. Capacity without cocaine, 480 c.c.; with cocaine, 490 c.c. No dilatation. Disappeared.

19.—Female, twenty-two. Duration four years. Urination forty times a day, twenty times at night. Capacity of bladder very small, 90 c.c. with ether. Diffuse redness, numerous ulcers, cicatrices of bladder. Diagnosis: chronic cystitis with thickening, right suppurative nephritis, ureteritis, nephrectomy. No dilatation. Two years later, urination six times a day and three times at night. This bladder dilated itself.

20.—Female, twenty-nine. Duration eight years. Urination ten to twelve times a day, the same at night. Intense congestion of the entire vesical mucous membrane. Scars, superficial ulcers. Diagnosis: chronic cystitis. Capacity without cocaine, 210 c.c.; with cocaine, 360 c.c. Cystotomy. Result unknown.

21.—Female, thirty. Duration four months. Intense congestion of the vesical neck and trigone. A few patches on the posterior wall. Diagnosis: cystitis. Capacity, without cocaine, 270 c.c.; with cocaine, 300 c.c. Dilated four times at intervals of four days up to 390 c.c. At the end of this time no bladder symptoms. Urination four times a day. Not at all at night.

22.—Female, fifty-two. Duration six years. Incontinence. Patches on the posterior wall. Diagnosis: left pyelitis, incontinence, cystitis. Capacity without cocaine, 300 c.c.; with cocaine, 350 c.c. No dilatation. Disappeared.

23.—Female, twenty-seven. Duration thirteen years. Urination twenty to thirty times a day, eight times at night. Intense congestion of the bladder wall. Diagnosis: stricture of the right ureter, suppurative nephritis on the right, pyelitis on left, cystitis. Capacity without cocaine, 150 c.c.; with cocaine, 200 c.c.

24.—Female, fifty. Duration three years. Urination eight to ten times a day, once at night. Universal redness of the bladder wall, superficial ulcerations. Diagnosis: right pyelitis, cystitis. Capacity without cocaine, 390 c.c.; with cocaine, 450 c.c. No dilatation.

25.—Female, thirty-six. Duration two years. Urination eighteen times a day, three times at night. Redness of the bladder and trigone. Diagnosis: cystitis, right floating kidney. Capacity without cocaine, 315 c.c.; with cocaine, 325 c.c. Dilated twice at four days' intervals up to 450 c.c. Greatly relieved. Urinates ten times a day, once at night. Less irritability. Recent case.

26.—Female, sixty. Duration one year. Urination ten to twenty times a day, six times at night. Intense congestion of the whole bladder. Superficial ulcers. Patches, redness. Diagnosis: chronic cystitis. Capacity without cocaine, 180 c.c. Cystotomy. Result unknown.

27.—Female, thirty-one. Duration two years. Urination ten times a day, eight times at night. Intense redness of the trigone and vesical neck. Bladder wall hyperemic. Diagnosis: cystitis, left salpingitis. Capacity without cocaine, 360 c.c.; with cocaine, 420 c.c.

28.—Female, forty-two. Duration five years. Urination twenty times a day, ten times at night. Intense congestion of the vesical neck and trigone. Diffuse redness of the bladder wall. Slight superficial ulcers, bleeding easily. Diagnosis: cystitis. Capacity without cocaine, 150 c.c.; with cocaine, 210 c.c.

29.—Female, twenty-nine. Duration three years. Urination six times a day, seven times at night. Universal redness. Superficial ulcers. Left ureteral orifice shaggy and roughened. Diagnosis: cystitis, stricture of left ureter, double pyelitis, double ureteritis. Capacity without cocaine, 260 c.c.; with cocaine, 300 c.c. Dilated four times at intervals of a week up to 390 c.c. Stricture also dilated. Marked improvement at once. Urination three times a day and twice at night.

30.—Female, twenty-nine. Duration five years. Urination forty times a day, twenty times at night. Universal redness with patches of greater redness. Superficial ulcers. "Golf-hole" ureter, left. Diagnosis: cystitis (gonorrhea), stricture of the left ureter, right movable kidney, double salpingitis, retroversion. Capacity without cocaine, 45 c.c.; with cocaine, 90 c.c. Dilated once. Severe renal colic followed, lasting twenty-four hours. Now in hospital.

31.—Female, thirty-four. Duration six months. Urination twelve to twenty times a day, six times at night. Bladder universally injected. Diagnosis: cystitis, right pyelitis. Capacity without cocaine, 120 c.c. Dilated twelve times at intervals of a week up to 240 c.c. Much relief. Urination six times a day and the same number of times at night.

32.—Female, forty-five. Duration one year. Urination twelve times a day, twelve times at night. Intense vesical congestion. Patches of bright redness. Superficial ulcers. "Golf-hole" left ureter. Diagnosis: chronic cystitis, suppurative nephritis. Capacity without cocaine, 90 c.c.; with cocaine, 90 c.c. Nephrectomy. Attempted dilatation once, but pain was severe. Still in hospital.

33.—Female, fifty-two. Duration thirty-four years. Constant irritability of the bladder. Urination twenty to thirty times by day, eight to ten times by night. Intervals of less frequency. General injection of the bladder, with superficial ulcers at first; later congestion only. Diagnosis: chronic cystitis, right floating kidney. Capacity without cocaine, 360 c.c. Cystotomy for five years. Closure of fistula. Still suffering.

34.—Female, twenty. Duration four years. Urination twenty times by day, twice by night. A large red patch upon the trigone on the right. Intense injection of trigone and vesical neck. Diagnosisc: ystitis, retroversion. Capacity without cocaine, 150 c.c. Dilated three times at intervals of four days up to 450 c.c. Greatly relieved. Urination ten times by day, once at night. Disappeared.

35.—Female, forty-one. Duration seventeen years. Urination ten to fifteen times a day, three or four times at night. Intense congestion of the bladder with superficial ulcers. Diagnosis: chronic cystitis, stricture of both ureters. Capacity without cocaine, 240 c.c.; died after nephrectomy.

36.—Female, forty. Duration three years. Slight injection of the bladder. Diagnosis: chronic cystitis, double pyelitis, calculus of the right ureter, double pyonephrosis. Capacity one year after the second nephrectomy 720 c.c., notwithstanding chronic cystitis for two or three years.

37.—Female, forty-two. Duration eight years. Urination twelve to twenty times a day, once to three times at night. Intense congestion of the trigone, vesical neck and ulcers about the left ureteral orifice. Diagnosis: cystitis, stricture of the left ureter, ureteritis, left salpingitis. Capacity, without cocaine, 480 c.c., with cocaine, 480 c.c. Dilated seven times at intervals of a week up to 500 c.c. Stricture also dilated. Urination five times a day and once at night. Much improved.

38.—Female, forty-eight. Duration ten years. Urination twenty times a day, ten times at night. Universal injection, scars, ulcers. Diagnosis: cystitis, suppurative nephritis. Capacity without cocaine, 150 c.c. Cystotomy ten years ago.

39.—Female, fifty-five. Duration seven years. Urination thirty to forty times a day, twelve times at night. Intense congestion of the whole bladder, with patches of greater redness. No ulcers. Diagnosis: chronic cystitis, double pyelitis. Capacity, without ether, 90 c.c. With ether 390 c.c. Declines treatment. This case shows the effect of spasm in diminishing the size of the bladder.

40.—Female, thirty-three. Duration one year. Urination twenty to thirty times a day. Small patch on the right wall of the bladder. Diagnosis: cystitis, right floating kidney. Capacity without cocaine, 330 c.c.; with cocaine, 570 c.c.

Exfoliative Cystitis.

41.—Female, thirty-three. Prequent urination, every fifteen minutes. Incontinence. These symptoms succeeded the passage of the entire mucous membrane. Capacity without cocaine, 90 c.c. Lost sight of.

Papilloma of the Bladder.

42.—Female, twenty-seven. Duration five years. Retention alternating with frequency. Rosetted papilloma around tbe vesical orifice in the bladder. Capacity, 300 c.c.

Carcinoma.

43.—Female, sixty-two. Frequent micturition, five months. Carcinoma of the bladder. Capacity, 90 c.c.

Inhibition of Vesical Contraction.

44.—Female, forty-six. Retention at times for eight months. Urination twice a day. Capacity without cocaine, 480 c.c.

Hysterical Retention.

45.—Female, twenty-nine. Retention, alternating with incontinence. Capacity, 1,200 c.c.

46.—Female, twenty-three. Duration four years. Retention at times, hysterical. Capacity, 1,800 without cocaine.

Normal Bladders.

47.—Female, sixty. Duration twelve years. Urination three or four times a day. Bladder normal. Capacity without cocaine, 270 c.c.

48.—Female, twenty-nine. Just after child-birth. Urination three or four times a day. Capacity, without cocaine, 600 c.c.; with cocaine, 870 c.c.

49.—Female, fifty-six. Normal bladder. Urination three or four times a day. Capacity without cocaine, 750 c.c.

50.—Female, forty-seven. Normal bladder. Urination three or four times a day. Capacity without cocaine, 330 c.c.; with cocaine, 390 c.c.

51.—Female, fifty-six. Normal bladder. Urination three or four times a day. Capacity without cocaine, 330 c.c.; with cocaine, 420 c.c.

52.—Female, thirty. Normal bladder. Urination three or four times a day. Capacity without cocaine, 240 c.c.; with cocaine, 300 c.c.

53.—Female, forty-seven. Normal bladder. Urination three or four times a day. Capacity without cocaine, 540 c.c.

54.—Female, sixty-four. Normal bladder, urination four or five times a day. Capacity, 330 c.c.

CASES IN LITERATURE.

Atony of the Bladder.

55.—H. H. Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 107). Male, forty-six. Urination every fifteen minutes. Syphilis of the cord; paraplegia, paralysis of the bladder with contraction. Capacity without anesthetic, 65 c.c. Dilated in two days to 120 c.c. Urination at the end of this time, four times a day. In one month dilated to 435 c.c., with daily dilatation. Several months later, capacity 435 c.c., and urination once in four hours.

Congenitally Small Bladders.

56.—Sinclair (*Medical Chronicle*, Manchester, 1894, ii, N. S. 82). Female, twenty-nine. Frequent micturition. Contracted bladder. No disease. No inflammation. Capacity, 60 c.c. Dilated daily and in a month capacity was 660 c.c. In six months there was a relapse and the treatment was resumed and cure followed.

Incontinence.

57.—Sims, H. M. (AMER. JOUR. OBST., 1889, xxii, 918). Female, seventeen. Troubled from infancy. Urination forty to fifty times a day. Incontinence at night. Capacity 50 c.c. Daily distention with a Davidson syringe. In two months held 360 c.c. Incontinence ceased. Later held 540 c.c., with occasional incontinence at night. Three months later she was cured. Sims explains this case as follows: "There was infantile neglect to properly empty the bladder when nature demanded. This continued neglect of Nature's call resulted in the bladder becoming so reduced in size and capacity that it could scarcely contain any water at all."

58.—Sims, H. M. (AMER. JOUR. OBST., 1889, xxii, 921). Female, eighteen. Suffered from infancy. Urine normal. Incontinence at night. Bladder capacity, 30 c.c. Dilated in a short time up to 180 c.c. In eight weeks capacity was 360 c.c., and later the bladder was stretched to 636 c.c. The patient was then pronounced well.

59.—Sims, H. M. (AMER. JOUR. OBST., 1889, xxii, 921). Female, thirteen. Suffered from infancy. Incontinence. Bladder capacity 20 c.c. Dilated daily and in five months bladder held 540 c.c.

Spasm of Muscles of the Bladder.

60.—Janet (*Ann. des Mal. des Org. Gén.-Urin.*, 1895, xiii, 138). Female, forty-eight. Family history of nervous troubles. Incontinence up to six years of age. At thirty-three years began to urinate frequently. Urine clear. Capacity, 100 c.c. At the end of twenty-six treatments was well. Dilatation daily at first, then every two days, then twice a week, then every week.

Dilated up to 600 c.c. The fluid was retained a quarter of an hour at first, then half an hour, then two hours. At the end of treatment urinated four times a day and once at night. (This case appears to me to be one of hyperemia of the vesical neck with subsequent spasm of the muscles. Janet's technic deserves trial. The bladder is filled with liquid and it is allowed to remain there as long as the patient can hold it.)

61.—Strong (*Boston Medical and Surgical Journal*, 1890, cxxiii, 53). Female, twenty-two. Frequent urination for five years. Urination every twenty minutes day and night. No inflammatory disease of the bladder. Retroflexion. Capacity a few ounces. Gradual dilatation with instructions to retain. Seven months later much better. Urination three or four times a day and once at night. (Strong thought that the cause of this condition was continued irritation resulting in spasm of the muscles and hence contracted bladder. He also thought that the case showed the influence of habit.)

Chronic Cystitis.

62.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 74). Female, twenty-three. Duration two years. Cystitis. Ulcers. Bladder dilated. Some improvement after several months.

63.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 75). Female adult. Duration ten years. Contracted bladder with ulcers. Bladder dilated. In three months bladder held 400 c.c. Patient was cured. No recurrence in three months.

64.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 75). Female, fifty-five. Chronic cystitis. Contracted bladder with ulcers. Cured in two months' treatment. Dilatation. Capacity not stated.

65.—Mahé (*Occidental Medical Times*, Sacramento, 1890, iv, 359). Male, twenty-seven. Cystitis. Rapid distention tried with success. After the first treatment there was profuse hemorrhage from the neck of the bladder. The patient was cured at the end of ten treatments. Mild solutions used.

66.—Skene (*Diseases of Women*, New York, 1889, p. 752). Female adult. Chronic cystitis and contracted bladder. She was in the habit of wearing a catheter at night for years. At the end of this time the bladder was dilated once. Peritonitis and death followed. At the autopsy a hole was found in the bladder, evidently where the catheter had eroded the membrane. The muscle walls were over half an inch thick.

67.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 73). Female, sixty-five. Cystitis, eleven years. Ulcers. Capacity 60 c.c. at first. Dilated to 300 c.c. Many ulcers healed. Doing well.

68.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 73). Female, sixty-five. Cystitis four months. General inflammation some ulcers. Bladder dilated daily. Treatment for thirty days. Capacity at first, 200 c.c.; at the end of the treatment, 750 c c.

69.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 74). Female. Duration two years. Cystitis. Capacity of bladder 100 c.c. Dilated up to 400 c.c. Marked improvement.

70.—Brown (*Johns Hopkins Hospital Reports*, 1901, x, 76) Female, cystitis. Capacity at first, 65 c.c. Later held 550 c.c. Treatment by dilatation. Cured.

71.—Robson (*British Gynecological Journal*, London, 1895–6, xi, 195). Female, thirty. Complete incontinence for twelve years. Examination showed no bladder cavity. Urine alkaline. Under ether the bladder was scraped of phosphates. Later ether was again given and the bladder was dilated to 60 c.c. She was then told to hold her water, and at the end of three months could hold 210 c.c. for six hours.

72.—Sims (AMER. JOUR. OBST., 1889, xxii, 922). Female, sixty. Cystitis for several years. Urinates thirty times at night, every few minutes by day. Capacity 30 c.c. Dilated to 360 c.c. in six weeks by daily dilatation. At the end of three months held 660 c.c. Urination then was four times a day. Patient well.

73.—Stone (*Atlanta Medical and Surgical Journal*, 1889–90, N. S. vi, 657). Male, thirty-eight. Chronic cystitis, three years. Contracted bladder. Lumbar nephrotomy. Died. Bladder held 30 c.c.

74.—Stone (*Atlanta Medical and Surgical Journal*, 1889–90, N. S. vi. 658). Male, seventy-five. Dilated from 90 c.c. to 180 c.c.

75.—Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 104). Male, thirty-two. Duration ten months. Urination twenty times a day. Capacity 100 c.c. In one month daily dilatation raised capacity to 500 c.c. with urination every four hours.

76.—Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 103). Male, forty. Urination every ten or fifteen minutes. Duration two years. Capacity, 30 c.c. Bladder dilated with a head of 4 feet of water every four hours daily. Capacity raised to 365 c.c. in four months. At the end of this time urination every four to six hours at night. Comfortable during the day. Health good.

77.—Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 101). Male, sixty-five. Cystitis, twenty years. Capacity, 30 c.c. Daily dilatation. Dilated up to 290 c.c. Contractile power did not return. Had a residual of 60 to 100 c.c.

78.—Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 102). Male, forty-one. Cystitis ten years. Urination every ten or fifteen minutes. Capacity 40 c.c. Dilated four times a day. At the end of three weeks capacity was 130 c.c. and urination every two and one-half hours.

79.—Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 101). Adult male. Urination forty-eight times a day. Capacity, 40 c.c. In ten days capacity 150 c.c. Urination not so frequent.

80.—Rothschild (*Deutsch. med. Woch.*, 1901, xxvii, 86). Female, twenty-eight. In 1894, acute cystitis. In 1895, cystitis again. Sick until 1899. Incontinence. Bladder felt as a hard body behind the pubes. Capacity, 10 c.c. Daily dilatation. In two weeks, 50 c.c. At the end of several months capacity 90 c.c. Very much more comfortable.

81.—Cullen (*Johns Hopkins Hospital Bulletin*, 1898, ix, 110). Female, cystitis. Dilatation eight times. Dilated from 160 to 240 c.c. Result not stated.

I was surprised on looking over the cases in literature to find that there were several in which incontinence was associated with contracted condition of the bladder. Sims explains this on the assumption that in childhood there had been a neglect to properly train the bladder, and that as a consequence of this neglect the bladder had become reduced in size. This seems to me not to be the true cause. Is is my belief that incontinence in childhood is always the result of disturbed innervation, for we never see this condition in any other than in neurotic, ill-developed children, usually with a neurotic family history. The trouble usually passes off at about puberty, or even before in some cases. I have, however, had two cases in which the affection was present in adult females about twenty-seven years of age. In both these cases there was a history of extremely nervous habit and in both there was a history of insanity in the family.

Neurasthenia of the bladder I have found to be very rare indeed. Janet (*Ann. des Mal. des. Org. Gén.-Urin.*, 1895, xiii, 134) calls attention to this condition in an excellent article on the subject. He makes the point that in this disease one should always seek the predisposing cause. This cause may be irritation at a distance from the bladder, preoccupation, hypochondria, some lesion of the central nervous system, and, lastly, bad habit, that is, a habit of passing water frequently when there is really no need of it. Janet endeavors to suppress the cause, if possible.

In these cases, suggestion acts very well. The patient should be told that there is no serious disease, and that an endeavor should be made to hold the urine as long as possible. It is really surprising what good results may be obtained by this simple means. A peculiarity of this trouble is, as it was pointed out by Guiard (*Ann. des. Mal. des Org. Gén.-Urin.*, 1891, xx, 231) that the calls to urinate occur especially during the daytime and that the patient at night is not usually disturbed. This is quite a diagnostic point. Another peculiarity in neurasthenics is that these bladders are usually of large capacity. Genouville, (*Gaz. des Hôp.*, 1895, lxxviii, 260) was the first to point out that in neurasthenics the tonicity of the bladder muscles is very much reduced. In one of his cases, 1,200 c.c. of fluid were injected into a bladder under a pressure of 8 cm. of water without causing pain and without causing a desire to urinate. This large capacity in neurasthenic bladders is, of course, due to the weakness of the muscles—a peculiarity in neurasthenia.

These neurasthenic bladders are easily distinguished from hysteric bladders. In neurasthenia the only bladder symptom is a desire to urinate frequently. In hysteria we are more apt to get retention of urine, while other stigmata of hysteria will usually make the diagnosis perfectly clear. In some instances, however, in my experience, a diagnosis of hysteria may remain in doubt for a good while, the stigmata not being perfectly apparent.

Treatment of neurasthenic bladders by dilatation is well worth trying. On the one case which I had, the result was gratifying. The patient had instant relief.

I have been very much gratified with my results in the treatment of hyperemia of the vesical neck and trigone by dilatation. This affection is very annoying and gives the physician a great deal of trouble. These bladders are usually of fair capacity. In thirteen cases the average capacity without cocaine was about 345 c.c. The following table shows the capacities at a glance, with and without cocaine.

	Without cocaine.	With cocaine.
No. 3	450 c.c.	540 c.c.
" 4	240 c.c.	480 c.c.
" 5	480 c.c.	570 c.c.
" 6	......	420 c.c.
" 7	300 c.c.	360 c.c.
" 8	720 c.c.	780 c.c.
" 9	180 c.c.	......
" 10	240 c.c.	300 c.c.
" 11	360 c.c.	480 c.c.
" 12	400 c.c.	......
" 13	480 c.c.	570 c.c.
" 14	150 c.c.	240 c.c.
" 15	480 c.c.	......

I think that spasm of the muscles of the bladder in this affection is responsible in part for the symptoms. In a number of cases it will be seen that the capacity was greatly increased when the bladder was cocainized. This spasm is what one might expect in this trouble. Most of these patients are nervous and have become so in consequence of the suffering. Their nervous system is in a state of tension and the irritable bladder, causing as it does a frequent desire to urinate, increases the nervous tension. Brooding over the affection is likewise responsible for a great deal of the suffering. Not only is the bladder irritable, but this irritability reacts upon the nervous system. Thus a vicious circle is created.

My results in the treatment of this disease have always been satisfactory. Without exception the patients have said that they were better as soon as the treatment was begun. Of course, as it is well known, hyperemia of the vesical neck is at times transitory, and there are periods of remission, during which the patient may not suffer at all. I would not say that dilatation is the only method of treating this affection. I think it is suggestive, however, that in my experience, dilatation has always at once proved beneficial. Certainly, I have found it far more efficacious than any other method of treatment with which I am familiar.

I have had but two cases of acute cystitis in which the capacity of the bladder was measured. In both cases there was a diminution of the capacity. This is what one would expect because there must always be spasm of affected muscles.

I have dilated the bladder in a number of instances of chronic cystitis, and I think I may say that in every case in which I used it, the result was good.

A glance at the following table will show the capacities of the bladder in chronic cases.

	Without cocaine.	With cocaine.
No. 18	480 c.c.	......
" 19	90 c.c.	......
" 20	210 c.c.	360 c.c.
" 21	270 c.c.	300 c.c.
" 22	300 c.c.	360 c.c.
" 23	150 c.c.	200 c.c.
" 24	390 c.c.	450 c.c.
" 25	315 c.c.	325 c.c.
" 26	180 c.c.	......
" 27	300 c.c.	420 c.c.
" 28	150 c.c.	210 c.c.
" 29	260 c.c.	300 c.c.
" 30	45 c.c.	90 c.c.
" 31	120 c.c.	240 c.c.
" 32	90 c.c.	90 c.c.

	Without cocaine.	With cocaine.
No. 33	360 c.c.	. . . . . .
" 34	150 c.c.	. . . . . .
" 35	240 c.c.	. . . . . .
" 36	720 c.c.	. . . . . .
" 37	480 c.c.	480 c.c.
" 38	150 c.c.	. . . . . .
" 39	90 c.c.	390 c.c.
" 40	330 c.c.	570 c.c.

Here again it is noticeable that the capacity of the bladder was considerably increased in a number of the instances after cocaine was applied to the mucous membrane. This, I think, shows the effect of spasm of the muscles. I must say that I was somewhat surprised in reviewing these figures to find that in so few instances of chronic cystitis was the bladder very much reduced in capacity. I am speaking now of my own personal cases. In a few of these, as it will be observed, the capacity was very small, but they were a very few. It was very striking, in reviewing the cases which I was able to find in a thorough review of the literature, to note that in almost every instance the capacity was exceedingly small, showing that the treatment was resorted to only because the capacity was so very small. There are only twenty in all. I am forced to conclude, therefore, that the capacity of the bladder in chronic cystitis of the nontubercular form is but seldom greatly diminished. In general, however, the smaller the bladder capacity, the more frequently the patient had to urinate; with very small bladders this symptom was pronounced. I believe that whether the capacity is reduced by interstitial changes or by spasm of the muscles, the result is the same, the patient under both these circumstances having to urinate frequently.

In one of my cases, in which the cystitis had lasted a good many years, the capacity was quite large (No. 36). This woman was of phlegmatic temperament, and I think there must have been less spasm of the muscles than usual in her case, though I cannot be positive of this. It is far different in the tubercular forms of cystitis with regard to capacity, and it will be shown later on that these bladders are almost invariably diminished in capacity.

The list of twenty nontubercular cases found in literature is as follows:

	Without cocaine.
No. 62	
" 63	
" 64	
" 65	
" 66	
" 67	60 c.c.
" 68	200 c.c.
" 69	100 c.c.
" 70	65 c.c.
" 71	less than 60 c.c.
" 72	30 c.c.
" 73	30 c.c.
" 74	90 c.c.
" 75	100 c.c.
" 76	30 c.c.
" 77	30 c.c.
" 78	40 c.c.
" 79	40 c.c.
" 80	10 c.c.
" 81	160 c.c.

I cannot determine very much in regard to the question of extent of lesions in diminishing the capacity of the bladder, and I think that the reason for this is that we have no method for determining just the amount of change going on in the wall of the bladder, that is, in the muscular and fibrous tissue. Judging from the cases as I have found them, I should say that a badly ulcerated bladder is more apt to be contracted than one which is not ulcerated. The presence of scars, cicatrices, and bands also was noted to be associated with a diminished capacity. In general, the longer the duration of the disease, the smaller the capacity, but this has its exceptions.

The influence of spasm of the muscles was very well illustrated in a number of instances. In one, in particular, that of a woman with chronic cystitis extending from many years (No. 39), the capacity was only 90 c.c. without ether, but with ether it was found to be 390 c.c. In this case there was double pyelitis, and the disease had been in progress for seven years. It is my belief that the treatment by dilatation is particularly efficacious in cases of this kind. The spasm is overcome, the tension is relieved, and the patient certainly feels very much better. On the other hand, I have seen cases in which the cystitis has lasted for many years, and yet there was no spasm of the muscles at all. This was illustrated in No. 36. In this case the woman had been suffering for a number of years and had been through two nephrotomies; yet when the bladder was measured a year after the last nephrotomy, it was found that there was a capacity of 720 c.c. In No. 24 also there was a fairly large capacity of 450 c.c., and in this case the woman had been suffering for some years; there was pyelitis on the right side in this case. I think I may say that both of these women were of a very phlegmatic temperament, and this may have had something to do with the absence of spasm.

It has been definitely shown that in cystitis of long duration all the coats of the bladder are affected, from the mucous to the peritoneal. Hallé and Motz (*Ann. des Mal. des Org. Gén.-Urin.*, 1902, xx, 21) have done more than anybody else to show the pathological condition of the bladder in a state of inflammation. These authors found a diminished capacity in all. Some of their bladders were extremely small. There was usually a loss of suppleness, a loss of motion and the bladders were incapable of much distention. Thickness of the wall was particularly found. Mahé (*Occidental Medical Times*, Sacramento, 1890, iv, 359) reports a bladder whose walls were half an inch thick. The patient had had cystitis for many years. Otis (*Philadelphia Medical Times*, 1881–2, xii, 500) also mentions a case of a patient with long-standing cystitis, and here the walls were four times the normal in thickness. One of the most marked features in chronic cystitis is hypertrophy of the muscles. This has been noted by Hallé and Motz (*loc. cit.*, p. 170). This hypertrophy is due to the increased work which the bladder is called upon to do. The inflammation affects every portion, interstitial tissue and muscular tissue as well. There is inflammatory infiltration, and the end result is disappearance of muscles, due to granular degeneration and compression by the interstitial tissue, and the result is sclerosis and hardening. The serous coat is often underlaid with fat which tends, of course, to prevent the bladder from dilating. Samways (*British Medical Journal*, 1900, ii, 17[illegible]1) has called attention to the hypertrophy which is seen in the subacute stage in cases of cystitis. This hypertrophy, of course, increases the strength of the bladder wall. Samways has called attention to the fact that this hypertrophy takes place quite regularly; as a result, all the individual fibers of which the coat is composed are very much increased in size. The result is that a sort of network is formed which greatly adds to the strength of the bladder. If we dilate in the stage in which this hypertrophy occurs, there is, of course, but little danger of doing any harm from overdistention.

Young (*Johns Hopkins Hospital Bulletin*, 1898, ix, 101) was the first to advise treatment by dilatation in cases of chronic cystitis, and his results were certainly remarkable. Before Young, Sims had advised dilatation, not for cystitis, but for incontinence with contracted bladder. Young commented on the excellent results obtained by this method. His explanation of the improvement is as follows: "The secretions are washed away, the individual bundles of muscular fiber are separated and loosened, folds or pockets are smoothed out, ulcers are stretched or cracked, the bladder muscle is exercised and its tonicity is improved, the mucous membrane is cleaned, stretched, and with increased vascularity is given a chance to throw off the inflammation."

I should consider that this treatment might well be compared to massage, and it is, in fact, a massage as applied to the bladder.

I do not think that there is any danger whatever in treating chronic cystitis by means of dilatation. I have never seen any bad results at all, and I consider the treatment to be absolutely innocuous. I think, however, we should be careful in our selection of cases. Certainly, no one would think of dilating a bladder unless that bladder had previously been cystoscoped.

Inhibition of Vesical Contractility.

This condition was formerly described as "spasm of the muscles of the vesical neck." The latest views are to the effect that the retention which characterized the condition is due to disturbed action of the nervous system. As a matter of fact, passage of the catheter in these cases is not difficult and there is no grasping of the instrument by muscles at the neck of the bladder. This subject was discussed at the first meeting of the International Congress of Urology held in Paris, 1908, by Albarran and Noguès (*Trans. Cong. Int. d'Urol.*, Paris, 1908, pp. 318 and 371). Bazy and Condamy in the discussion claimed priority in discovery.

I have seen but one case of this kind which [I think was undoubted.

NORMAL BLADDERS.

In eight normal bladders I found the capacity to be, on an average, about 420 c.c. This was without cocaine. With cocaine the capacity could be increased about 60 to 150 c.c. In one instance, that of a woman who had just been delivered of a child, I found a very large bladder (No. 48) and it held 870 c.c. with cocaine. I suppose that this large capacity must have been due to softening of the walls under the influence of the congestion of pregnancy. James (*Edinburgh Medical Journal*, 1878, xxiv, 293) found the adult male bladder with two feet of water pressure to be 600 c.c. Genouville (*Arch. de Physiol.*, 1894, fifth series, vi) found as a result of his observations, that the normal adult experiences a desire to urinate when there are 250 c.c. of liquid in the bladder. The pressure under these circumstances, Genouville found to be about 15 cm. of water.

PERSONAL CASES OF TUBERCULOSIS OF THE BLADDER.

82.—Female, thirty-three. Duration one year. Micturition twenty to thirty times a day, twenty times at night. Bladder shows intense congestion, superficial ulcers, bleeding points. Diagnosis: tubercular cystitis, stricture of the left ureter. Capacity of bladder without ether, 75 c.c.; with ether, 90 c.c. Dilated once only. Severe pain and hematuria followed. Waiting for bladder to heal.

83.—Female, thirty. Duration one year. Urinates twenty times a day, four times at night. Bladder shows intense congestion, ulcers about the left ureteral orifice; "golf-hole" left ureter. Diagnosis: tubercular cystitis. Capacity without ether, 150 c.c.; with ether, 180 c.c. No dilatation. Died from the effects of calculus of right ureter two years after nephrotomy of the left kidney.

84.—Female, thirty-seven. Duration, many years. Bladder shows intense congestion, ulcers, tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 100 c.c.; with ether, 120 c.c. No dilatation.

85.—Female, twenty-three. Duration, five years. Urinates ten to fifteen times a day, five times at night. Bladder shows intense congestion, tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 120 c.c.; with ether, 150 c.c. No dilatation.

86.—Female, sixty. Duration four years. Urination ten to twenty times a day, twenty times at night. Bladder showed intense congestion with superficial ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 120 c.c. No dilatation.

87.—Female, twenty-two. Duration one year. Urination forty times a day, six times at night. Bladder showed intense congestion, fibrin, scars, ulcers. Diagnosis: tubercular cystitis.

Capacity without ether, 120 c.c.; with ether, 150 c.c. Nephrotomy performed, and at the end of two years, from self-dilatation, capacity 210 c.c. No artificial dilatation done.

88.—Female, twenty-two. Duration seven years. Urination twelve times a day, eight times at night. Bladder showed ulcers, intense congestion, and tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 90 c.c.; with ether, 90 c.c. No dilatation done.

89.—Female, thirty-eight. Duration one year. Urination twenty times a day, twelve times at night. Bladder showed intense congestion, ulcerations, and granulations. Diagnosis: tubercular cystitis. Capacity without ether, 90 c.c.; with ether, 90 c.c. No dilatation.

90.—Female, twenty-eight. Duration seven years. Urination forty times a day, twenty times at night. Bladder showed ulcers, intense congestion, tubercles. Diagnosis: tubercular cystitis. Capacity without ether 85 c.c.; with ether, 85 c.c. Cystotomy performed and bladder healed under Guyon treatment; then dilatation done. Bladder increased in capacity from 85 c.c. to 200 c.c. in twenty treatments at intervals of four days. Patient is now well and urinates once in three hours.

91.—Female, thirty-five. Duration two years. Urination twenty to thirty times by day, ten to fifteen times by night. Bladder shows intense congestion. Cystotomy; opening now present. Bladder thickened and ulcerated. Diagnosis: tubercular cystitis. Capacity of bladder as measured by sight, about 30 c.c.

92.—Female, thirty-two. Duration many years. Urination twenty times a day, ten times at night. Diagnosis: tubercular cystitis. Capacity without ether, 100 c.c.; with ether, 120 c.c. No dilatation.

93.—Female, thirty-nine. Duration two years. Urination thirty times a day, eight times by night. Bladder shows intense congestion, tubercles, and ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 120 c.c.; with ether, 120 c.c. No dilatation.

94.—Female, thirty-five. Duration, two years. Urinates twenty to thirty times a day, four or five times at night. Bladder shows intense congestion, granulations, and ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 60 c.c.; with ether, 75 c.c. No dilatation.

95.—Female, thirty. Duration five years. Urination twenty times a day, ten times at night. Bladder shows intense congestion and ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 100 c.c.; with ether, 120 c.c. No dilatation.

96.—Female, twenty-two. Duration ten months. Urination forty times a day, twenty times at night. Bladder shows intense congestion, tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 100 c.c.; with ether, 120 c.c. No dilatation.

97.—Female, thirty-five. Duration two years. Urination twenty times a day and ten times by night. Bladder shows intense congestion, granulations and ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 90 c.c.; with ether, 100 c.c. No dilatation.

98.—Female, thirty-one. Duration, two years. Urination thirty times a day, twenty times by night. Bladder shows intense congestion, ulcers, granulations. Diagnosis: tubercular cystitis. Capacity without ether, 40 c.c.; with ether, 60 c.c. Nephrectomy. Dilated once, two months after nephrectomy. Intolerably painful and bleeding followed immediately. Still in hospital.

99.—Female, twenty-two. Duration, three months. Urination twenty times by day, ten times by night. Bladder shows intense congestion and ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 90 c.c.; with ether, 120 c.c. No dilatation.

100.—Female, thirty-two. Duration, three years. Urination twenty times by day, ten times by night. Bladder shows intense congestion, ulcers, and tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 90 c.c. No dilatation.

101.—Female, seventeen. Duration, six months. Urinates thirty times by day, twenty times by night. Bladder shows intense congestion, tubercles, no ulcers. Diagnosis: tubercular cystitis. Capacity without ether, 120 c.c.; with ether, 140 c.c. No dilatation.

102.—Female, twenty-one. Duration seven years. Urination twenty to thirty times by day, twenty times by night. Intense congestion, ulcers, and tubercles. Diagnosis: tubercular cystitis. Capacity without ether, 65 c.c.; with ether, 90 c.c. Cystotomy. Fistula open five years, then closed. Capacity after cystotomy, 75 c.c. Dilated in fifteen sittings at intervals of four days up to 200 c.c. Urinates once in three hours.

103.—Female, forty-four. Duration fifteen months. Bladder shows intense congestion, ulcers, scars, and tubercles. Diagnosis: tubercular cystitis. Fecal fistula anterior to cervix. Capacity without ether, 360 c.c. No dilatation.

The first point which strikes our attention in looking over these cases is the relation that exists between the capacity of the bladder and the duration of the disease. The following table shows this at a glance:

No. 82	One year	75 c.c.
" 83	One year	150 c.c.
" 84	Seven years	100 c.c.
" 85	Five years	120 c.c.
" 86	Four years	120 c.c.
" 87	One year	120 c.c.
" 88	Seven years	90 c.c.
" 89	One year	90 c.c.
" 90	Seven years	85 c.c.

No. 91	Two years	30 c.c.
" 92	(?)	120 c.c.
" 93	Two years	120 c.c.
" 94	Two years	75 c.c.
" 95	Five years	120 c.c.
" 96	Ten months	120 c.c.
" 97	Two years	90 c.c.
" 98	Two years	60 c.c.
" 99	Three months	120 c.c.
" 100	Three years	90 c.c.
" 101	Six years	120 c.c.
" 102	Seven years	90 c.c.
" 103	One year 6 months	360 c.c.

It will be seen that the capacity in every instance, with one exception (103) is small, no matter what the stage of the disease. This would seem to show that other causes than organic changes in the bladder wall must be at work in determining the reduced size of the bladder in tuberculosis.

In a most excellent article on tuberculosis of the bladder by Hallé and Motz (*Ann. des Mal. des Org. Gén.-Urin.*, 1904, xxii, 163) the capacity of the bladder is carefully studied at various stages of the disease. It is greatly to be regretted, however, that no exact measuring was done. Rather vague terms, such as large, small, and moderate capacity, are made use of. However, the article as a whole is decidedly one of the best yet published. These authors insist that a large capacity is not infrequently met with in vesical tuberculosis, especially toward the final stages of the disease. In some instances they found postmortem bladders reaching even to the umbilicus. The only material was autopsy material. The thickness of the walls in the bladders studied by these authors varied from 1 millimeter to 2 centimeters.

Hallé and Motz (*loc. cit.*, xxii, p. 210) state that in the beginning of the disease the capacity is small or medium. As the disease progresses the bladder shows an increase in size, and toward the end they state (*loc. cit.*, p. 259) that the increase in size is almost the invariable rule. They have only one case (*loc. cit.*, p. 257) in which the bladder was small at the termination of the disease. In this case there had been a fistula during life. They likewise report five other cases of small bladders at the end of the disease in all of which, however, a cystotomy had previously been performed.

Their general conclusions in regard to the size of the bladder are as follows (*loc. cit.*, p. 260): "In the beginning of the disease the lesions are limited to the membrane. The capacity is normal at this time, but the walls are already thickened; at the more advanced stage, when the tubercular lesions have affected the deeper structures of the bladder, the capacity is small; during the stage of ulceration, the muscle is destroyed in part, and in this stage the bladder begins to dilate, finally the walls are thinned, the muscle is totally destroyed, and the bladder begins to distend."

My criticism of these results would be this: that all these bladders were studied postmortem, at a time when the spasm of the muscles could be eliminated. It is my opinion that this spasm plays a large part in reducing the capacity of the tubercular bladders.

I have seen twenty-two cases of tuberculosis, some of them of very long duration, and I have never seen a bladder of very large capacity; in fact, I have found the majority were very much diminished, as will be readily seen on consulting the table. At the same time I would not be understood as saying that spasm alone is the invariable cause of reduced capacity in vesical tuberculosis. In cases 82 and 99 of my list, the capacity was not appreciably increased under ether; the same was true in certain other of my cases, but I particularly noted these two cases, for the bladder wall seemed to be hard and rigid and unyielding. In these cases the interstitial changes were undoubtedly responsible for reduced capacity. Even after the process has come to an end—we will say after cystotomy and after thorough treatment of the bladder—these walls are extremely unyielding and the cavity is only with great difficulty made larger by dilatation.

This spasm of the muscles is something which one would expect and is quite analogous to the spasm of the muscles in any part of the body which overlie an inflamed area. The effect of spasm is of course to hold the bladder fixed, and in this way undoubtedly the irritation is made less. I have never had an opportunity of studying tubercular bladders in the postmortem state, so that my views on the subject may be said to be purely clinical. I think, however, that it is significant that in practically all the cases under my observation the bladders were of small capacity.

The changes which take place in a tubercular bladder have been admirably described by Hallé and Motz (*Ann. des Mal. des Org. Gén.-Urin.*, 1904, xxii, 183). It may be said, in general terms, that in the beginning of the disease the inflammation is confined to the mucous membrane; later, the lesions penetrate into the muscular walls, and these are destroyed in places. Ulceration may occur in various parts of the bladder and these ulcers may extend quite deeply. Caseation is also occasionally seen, but it is quite rare. In well advanced cases none of the muscular tissue is spared. The end-result is the formation of dense fibrous tissue. This tissue is not tubercular, and in fact has nothing of a tubercular character. The authors comment on the fact that this fibrous tissue is often quite invulnerable to tubercular change. When the end result has been reached, the authors state that the bladder begins to dilate. Perivesical changes are rare.

By way of comparison with my own cases, Hallé and Motz's (*loc. cit.*, p. 175) cases are herewith given in detail. These authors divide their cases into the following classes, beginning stage, active stage, and final stage.

HALLE AND MOTZ'S LIST OF CASES OF TUBERCULOSIS OF THE BLADDER.

Cases in the Beginning Stage.

104.—(Page 175.) Male, thirty. Small bladder; ulcers on the trigone.

105.—(Page 175.) Female child. Capacity not stated. Lesions on the trigone and lateral walls. Ulcers.

106.—(Page 176.) Male, thirty-four. Large bladder; walls slightly thickened. Lesions on the lower surface. Ulcerations.

107.—(Page 177) Male adult. Moderate capacity. Thick walls, ulcerations on the lateral walls.

108.—(Page 178.) Male, forty-nine. Large bladder; walls slightly thickened. Lesions on the vesical neck, anterior wall and trigone.

109.—(Page 179.) Adult male. Large bladder; moderate capacity. Walls slightly thickened. Ulcerations on the base.

Cases in the Active Stage.

110.—(Page 180.) Adult. Small capacity; thick walls, ulcerations.

111.—(Page 160.) Adult. Moderate capacity; rather small. Ulceration near the left orifice.

112.—(Page 181.) Adult. Small capacity; thick walls, ulcerations.

113.—(Page 181.) Adult. Moderate capacity; rather small. Thick walls, ulcerations on the trigone and the right ureteral orifice.

114.—(Page 188.) Male, thirty-six. Small capacity; external walls fat-laden. Ulceration throughout. Hypertrophied muscles; connective tissue infiltrated.

115.—(Page 188.) Male, twenty-five. Moderate capacity; surface ulcerated; muscles hypertrophied.

116.—(Page 190.) Male, fifty-two. Large bladder; unequal thickness. Lesions on the lower surface.

117.—(Page 192.) Adult, thirty-seven. Medium capacity; thick walls. Ulcers around the orifice.

118.—(Page 192.) Male, forty-seven. Large bladder; unequal walls, ulcers throughout. Muscular coat preserved.

119.—(Page 192.) Female adult. Small capacity. Thick walls. Much fat externally. Deep ulceration of the whole bladder.

120.—(Page 201.) Adult. Large bladder. Thin walls, deep ulcers on trigone.

121.—(Page 204.) Adult. Small bladder. Thick walls, caseous masses. Muscle preserved.

122.—(Page 205.) Child's bladder. Large. Thin walls, irregular surface, internal surface smooth, with no trace of former structure.

123.—(Page 205.) Female, twelve. Large bladder. Caseation in the walls almost universal.

124.—(Page 207.) Adult, thirty-nine. Small bladder; thick walls. Internal surface irregular, caseation in walls, also hypertrophied. Muscular tissue hypertrophied.

125.—(Page 208.) Adult. Medium capacity; thick walls; fat externally; deep ulceration on trigone. Caseous walls; infiltrated intermuscular tissue.

End-result Cases.

126.—(Page 242.) Adult. Large bladder. Ulcerated, muscular tissue alone preserved, but damaged.

127.—(Page 243.) Adult. Moderate capacity; walls thickened, infiltrated, cicatricial tissue. Caseation.

128.—(Page 245.) Large bladder; thick walls, hard and rigid. Typical ulceration of the internal surface, muscles partially preserved, fat tissue externally.

129.—(Page 245.) Adult. Large bladder; thin walls, rigid, fibrous. Internal surface smooth, muscles atrophied and in part gone.

130.—(Page 246.) Adult. Large bladder; rigid walls. Dense fibrous tissue, muscle almost entirely gone; sclerosed and atrophied.

131.—(Page 247.) Adult. Four-fifths of the walls is fatty tissue; slight sclerosis.

132.—(Page 247.) Adult. Very little muscular tissue. Capacity not given.

133.—(Page 248.) Adult. Large bladder. Thin walls. Transparent and thin like paper at the summit. Caseous and no muscle tissue.

134.—(Page 249.) Male, thirty-five. Large bladder, extending up to umbilicus. Smooth surface. A little fibrous tissue, muscles invaded universally.

135.—(Page 250.) Adult. Large bladder, friable walls, smooth surface, fibrous tissue.

136.—(Page 251.) Adult. Large bladder, unequal thickness, fibrous walls, thin and smooth. Some muscle tissue remaining.

137.—(Page 252.) Adult. Adherent to certain organs. Lesions at base.

138.—(Page 253.) Very large bladder, ulcers near ureters.

139.—(Page 253.) Adult. Large bladder; unequal thickness. Lesions at the base. Thin on top

140.—(Page 257.) Male, thirty-three. Small bladder. Very small capacity. Three cm. wide, 2 cm. high. Pericystitis. In this case there was a fistula which Hallé and Motz thought prevented the bladder from getting large.

141.—(Page 261.) Adult. Small capacity. Thick walls. Ulcers and caseation; adherent to surrounding organs.

This list of cases, when compared with mine, shows very clearly that in tuberculosis of the bladder it is largely the spasm of the muscles which reduces the capacity.

Analyzing these cases, we find that in the beginning stage there were six bladders, three of which were large, one moderate, one small, and one not stated. In the active stage there were sixteen bladders, five of which were large, four moderate, and seven small. The bladders in the final stage were sixteen. Among these ten were large, one moderate, two small, and in three the capacity was not given.

I do not think that we can say much in regard to the capacity of the bladder as dependent upon the seat and extent of the lesions. In my experience, bladders in which the disease was confined almost entirely to the bases were quite as likely to have a small capacity as those in which the lesions were more widely scattered.

It is my feeling that in the active stage it is unwise to attempt dilatation. I have tried it twice, but in both instances the pain was intolerable.

In the literature, however, two cases were found in which tubercular bladders were dilated during the active stage and with success. These cases were as follows:

142.—Young (*Johns Hopkins Hospital Bulletin*, 1898 ix. 103). Male, twenty-eight. Duration five years. Micturition every thirty to forty minutes. Capacity, 60 c.c. Daily dilatation. Later, capacity 180 c.c. Micturition once in three hours.

143.—Battle (*Lancet*, 1899, Dec. 9, 1587). Male, twenty-two. Duration two and one-half years. Dilated under ether with a head of 4 feet of water. Then daily dilatations at 4 feet of water. In thirty-four days could hold urine three hours and had a capacity of 300 c.c. Two months later could hold urine four hours and urinated once at night. Before treatment, was urinating every ten minutes to one hour.

It would seem, from these two cases, that dilatation may sometimes be beneficial in the active stage. Perhaps it is worth trying. It is indicated in those long-standing cases of tubercular cystitis in which some degree of toleration has been attained. Certainly, no one would think of attempting the treatment in the presence of an acutely inflamed sensitive bladder.

Cases best suited for treatment by dilatation are those in which the tubercular process has been thoroughly eradicated by appropriate means, and when this has been done and the inflammation has entirely disappeared, such a bladder may be dilated with considerable prospect of relief. A cystotomy may have to be performed before this stage is reached, and a tubercular kidney and ureter will have to be removed.

I think that too much must not be expected from simple nephrectomy and ureterectomy. It is stated in many of the books that a bladder will get well if those operations have been performed.

This has not been my invariable experience. It is my custom, after nephrectomy, to wait for a considerable length of time before touching the bladder, say about two months. I then give the patient ether and cauterize the bladder thoroughly from top to bottom with solid nitrate of silver stick. This treatment is followed up, after a time, by constant applications of silver at intervals of a few days, and if it does not succeed I do a cystotomy and keep the patient under close observation until healing has taken place. When the bladder is healed and when the cystotomy wound has been closed, it is then time to try dilatation.

A contracted bladder will sometimes help to dilate itself. I had a case (No. 90) of this sort in a woman who had primary tuberculosis of the bladder. She had a cystotomy and she was treated for a long while by the Guyon method. After the fistula was closed she was treated by dilatation. She went away for a short time and she was told that during her absence she must try and hold water as long as possible. She did so, and on her return it was found that the bladder held 25 c.c. more than it did before her departure.

SUPRAPUBIC OPERATION UPON THE PELVIC FLOOR FOR PROLAPSE OF THE UTERUS.*

BY
W. M. POLK, M. D., LL. D.
New York.

(With eight plates.)

On January 5, 1909, P. D., a widow, æt. forty-three, doing housework for a living, was admitted to my service (Ward 23) at Bellevue Hospital. The following is her history from the records;:

Diagnosis.—Prolapsed uterus and cystitis.

Operation.—January 8, 1909.

Family History.—Father killed in battle; mother died of old age; one sister and two brothers dead, causes unknown; one brother living and well. No tubercle bacilli kidney or brain diseases or any similar condition to that which patient complains of.

Married eleven years. Miscarriages, six.

Widowed four years. Menopause, 1906.

Previous History.—Remembers no diseases of childhood. Has always kept well as an adult except for present condition.

Injuries, none. Operations, none.

Menstruation.—Began at eleven years and was regular every twenty-eight days, lasting four days, with little pain and discomfort, until time of first miscarriage, 1894; since that time menstruation has been regular (except when pregnant) and painless, but has lasted from ten to fourteen days with much bleeding. Menopause in July, 1906, was easy.

Pregnancies.—In the summer of 1894 patient had her first miscarriage at six months, due to a fall. In bed fourteen days and felt well afterward except for sensation of weight in region of uterus.

1895.—Second pregnancy, a miscarriage at six months. Was spontaneous without known cause and patient remembers no particulars except that it was easy.

1897.—Third pregnancy with delivery of a dead seven months' fetus spontaneously. Patient was in bed for eight weeks and was very sick following event.

1899–1901.—Fourth pregnancy occurred sometime during this period. Spontaneous delivery at six months. No after effects.

1901–1903.—Fifth pregnancy like fourth.

1904.—Sixth pregnancy in March. Like fourth and fifth.

Vesical symptoms, not annoying.

Vaginal discharge, none.

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* Read before the American Gynecological Society, April 20–22, 1909.

Venereal history, none.

Habits, coffee and tea in quantities; no alcohol.

Bowels, regular.

Present History.—One year before admission patient says she fell down stairs while carrying a hod of coal and the next day noticed a mass like a ball protruding slightly from the vagina. The mass was not particularly sore or tender but would not remain when replaced in vagina, and has continued to get larger and larger up to present time. Patient has lost thirty-one pounds in the last four years, since husband's death, but attributes it somewhat to hard and unusual work as she was forced to support herself. Has had a good appetite all the time and states positively that she has had no discharge or pain. She is very thin, looks ten years older than reported, and has evidently suffered much hardship, but full of courage and determination to care for herself, in fact insists on immediate operation that she may return to her work.

Examination shows complete eversion of the vagina and with it prolapse of the entire uterus. Slight traction upon the cervix enables one to coaptate the vagina, above the fundus, and outline the entire organ below this. The bladder is drawn down with the mass, as proved by the sound. The rectum has separated itself from the everted vagina and is in fairly good position.

Five days from admission I operated. Upon opening the abdomen, instead of the usual condition of the pelvic floor, slightly concave, with the uterus and broad ligaments standing out prominently above it, I found a pit with the uterus sunk well down therein, the base and posterior face of the bladder dragged down with it, the broad and round ligaments reaching up above it to the pelvic brim like arms thrown up above the head; in similar, but in less pronounced manner, the uterosacral ligaments ran up to their attachment on the sacrum. Seizing the fundus, the uterus and its attachments were drawn easily upward, till it stood above the pelvic brim, the ligaments reaching downward behind, to the face of the sacrum, at the sides to the pelvic brim. There was complete relaxation, with elongation of all the interpelvic supports of the uterus, vagina, and bladder. I operated so as to shorten them. The uterus was removed, as the woman had passed the menopause. The separation of the bladder, suturing of the vagina, of the peritoneum and underlying fibro-connective tissue, the broad and uterosacral ligaments, was done as described in the paper I append. The only departure made was in dissecting out the ureters before passing the sutures; namely, those deep which dealt with the vagina, those higher which dealt with the fibro-connective tissue and peritoneum. The dissection satisfied me, that the work could be done equally well without this step.

I now beg to submit the operation to your criticism, not only as presented in this paper, but in the person of the patient who comes here to submit herself to your examination.

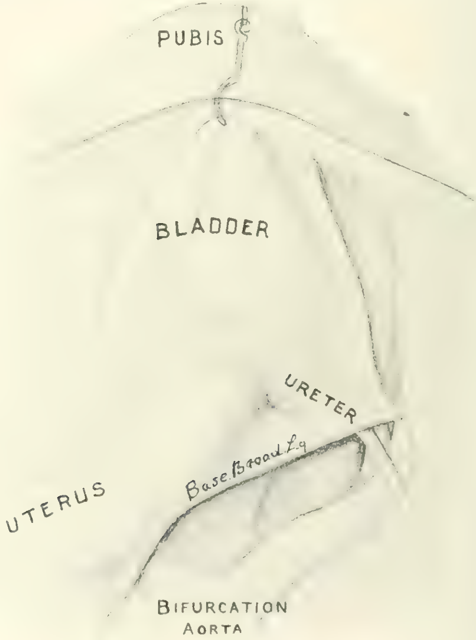

Fig. A.—Anatomical.

SUPRAPUBIC OPERATION UPON THE PELVIC FLOOR FOR PROLAPSE OF THE UTERUS.

The operation is designed to aid in the correction of all degrees of prolapsus uteri, but *particularly its ultra forms.*

Having an extreme case, one with the uterus, the base of the bladder, and a good part of the vagina outside the vulval opening, the patient is placed in bed and there treated for a week or ten days. This is for the purpose of reducing the prolapse, and permitting the affected viscera and surrounding structures to regain as much of the normal status as possible. As good a condition local and general as can be gotten in the case being secured, the operation is performed.

After opening the abdomen, the Trendelenburg position secured, and the pelvis (the true pelvis) cleared of all intestine but the lower sigmoid and rectum, the uterus is firmly caught with a double tenaculum at its anterior vaginal juncture. Pulling it up and making the vagina taut, an anteroposterior incision is made reaching from the tenaculum to the bladder (which meanwhile is held against the pubis), and extending through tissue to the recognizable vaginal wall (Plate I).

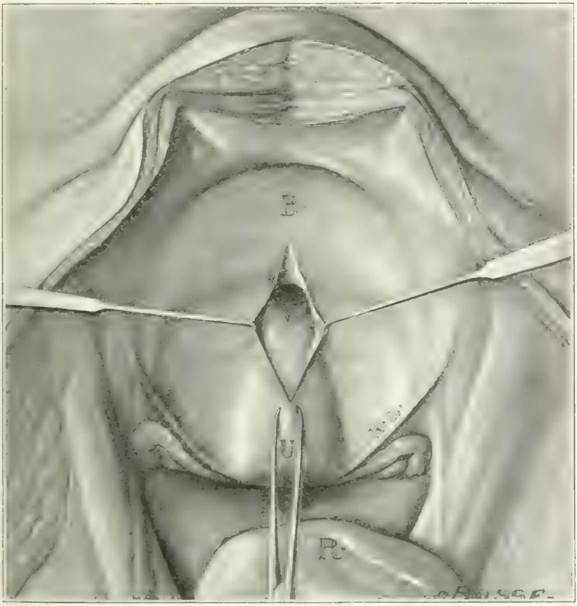

FIG. 1.—Utero-vesical space opened. Uterus retained or removed as operator determines.

Through this opening which is stretched laterally, the bladder is separated from the face of the vagina as far as the trigone or neve somewhat beneath it. The ureters are pushed aside, and where

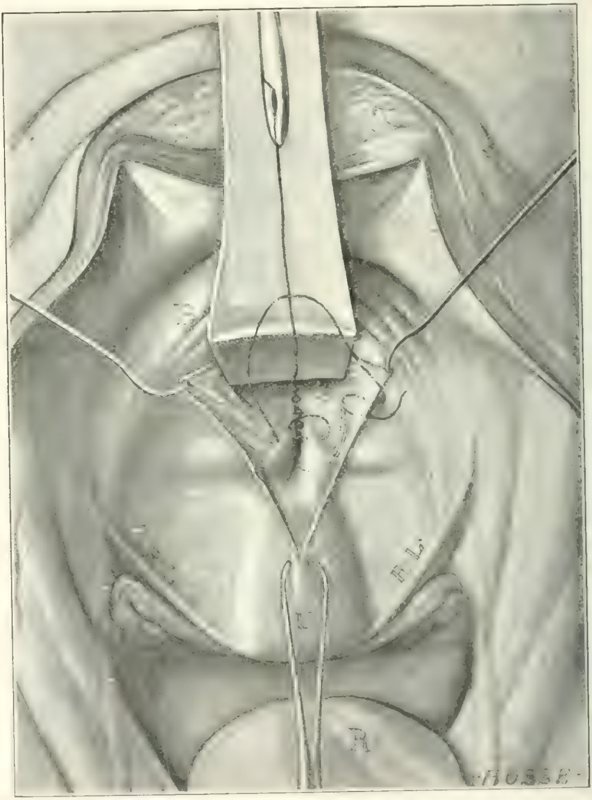

Fig. 2 Plication of anterior wall of vagina.

they turn in toward the trigone, are displaced upward and forward with the bladder. In this maneuver the anterior face of the vagina is adequately exposed beneath the bladder, but this must also be done as far up as the site of the tenaculum. As you know, this is an easy task. The next step is to unite by suture with continuous kangaroo tendon the anterolateral lines of the vagina (one on each side) from below upward, beginning as far down as possible and ending just below the upper end of the original incision (Plate II). To secure proper exposure, the bladder.

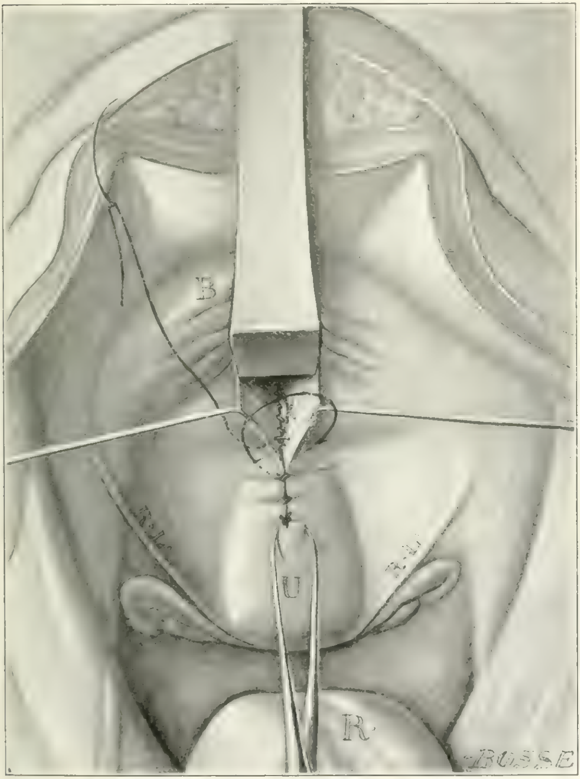

Fig. 8. Uterus retained or removed as operator determines.

after separation, is held forward with a broad retractor. The suturing is done with a short, stout, curved needle, aided by a hook with which the vagina at the point of suturing is caught up

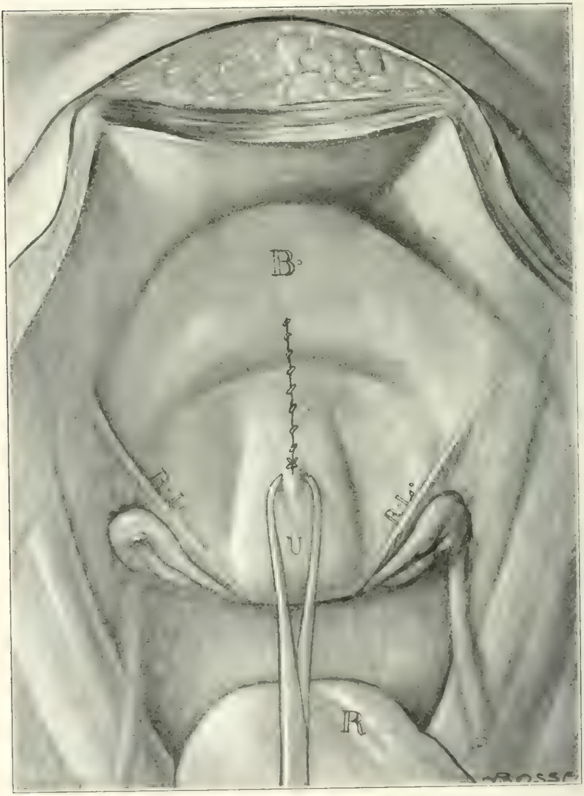

FIG. 4. Anterior plication finished.

and directed toward the point of the needle. Another method is to use the fingers of the disengaged hand in the vagina to lift it up stitching down upon them. It is not necessary to penetrate into the vaginal cavity, but if done no harm will accrue, the surface having been already carfully prepared. A second line of continuous kangaroo suture is now placed, so as to draw to the median line as much fascia and covering peritoneum as can be brought in from the sides of the bladder, the vagina and the uterus (Plate III). The structures in this region which must be left outside the sutures, are the ureters and the uterine arteries—the arteries are in danger at the upper end of this field, the ureters at the lower. Both can be outlined by careful fingering of the tissue as the sutures are passed; this is easily true of the vessels, and I believe also of the ureters, but in view of the greater harm coming from their injury, they can be outlined by prior catheterization, or if not, readily exposed by blunt dissection, where they curve inward to the upper outer angles of the trigone. This second line of sutures, as intimated, must be entered far enough from the edge of the incision to take up all slack tissue and in passing, follow an oblique direction from the point of entrance upon peritoneal surface, downward and inward toward the sutured line of the vagina, into which it may pass, then into the fascia at opposite vaginal edge and so on obliquely upward and outward so as to include here also all slack tissue. The most important loops of this suture are those employed at the lower portions of the incision—the last two, need not enter the vaginal tissue, but, going down to it, pass over, and then out on the opposite side as before. Their effect will be to accentuate the line of the bladder base, in fact carry it in further beneath the bladder and fold in some of its tissue (Plate IV). As will be seen later in bringing out the anatomical feature of the subject, the suspensory ligament of the bladder is shortened in this maneuver, as well as the lateral fascial connections of the vagina (which merge with the lateral supports of the bladder below, and the broad ligaments above, serving the purpose of ligaments) and the basic lines of the broad ligaments. It now remains to shorten the uterosacral ligaments. These are caught up at about the junction of the inner and middle thirds, drawn in from this point and stitched with the same suture material either to the inside, below, or to the outside of their uterine attachment, as is most easily done. It is essential to take in as much of the slack as is needed to give them their original supporting function (Plate V).

The question as to the disposition of the uterus should be settled at the outset of the operation. If to be retained, the operation as described will be carried out with the addition, if deemed best, of shortening the round ligaments, but this is not essential. If it is a senile uterus, I suggest it be thrown forward and the fundus held in the sulcus behind the bladder by a retaining suture through the round ligament at each cornua (Plate V). This for the purpose of utilizing in this region all the aid the round ligament and remaining parts of the broad ligament can furnish as supports. If the uterus is removed, the variations from the operation as described relate to the treatment of the broad and

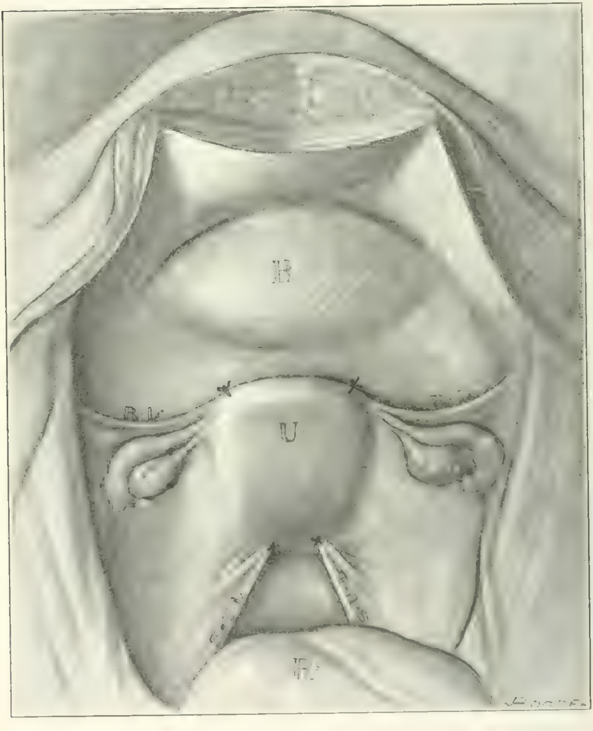

FIG. 5.—Senile uterus retained and held forward.

uterosacral ligaments. The operation is then to be executed as described as far as the completion of the suturing in front of the uterus, then this organ is dissected or cut from its lateral attachments to about the level of the internal os, care being taken to stop short of the attachment of the uterosacral ligaments. The cut surfaces of the stump are now stitched together in continuation of the line of original incision; the loose ends of the severed broad and round ligaments caught up and included in this line of suturing (Plates VI and VII). And finally the uterosacral ligaments are caught up at the junction with the stump (Plate VII); the right is drawn over and stitched to the stump to the left, and the left is drawn to overlap the right and stitched in corresponding position to that given the left ligament (Plate

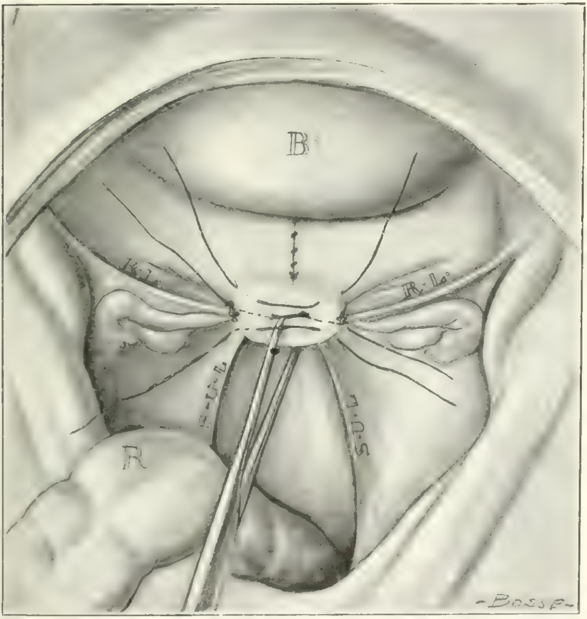

FIG. 6.—Uterus removed. Round and broad ligaments attached to stump

VIII). The elongation and relaxation of all these tissues makes the several steps of the operation easier than one might infer from an experience confined to the normal pelvic floor.

With the completion of any one of the procedures outlined, the suprapubic operation upon the pelvic floor will have been finished. After closing the abdominal wound, further procedure can be determined by the patient's condition. It remains only to operate upon the perineal structures. If much is needed, then no doubt it will be best to postpone operation, otherwise, do it at once, applying any one of the operations upon the levator ani, lower posterior vaginal wall (rectocele) and perineum, the operator prefers.

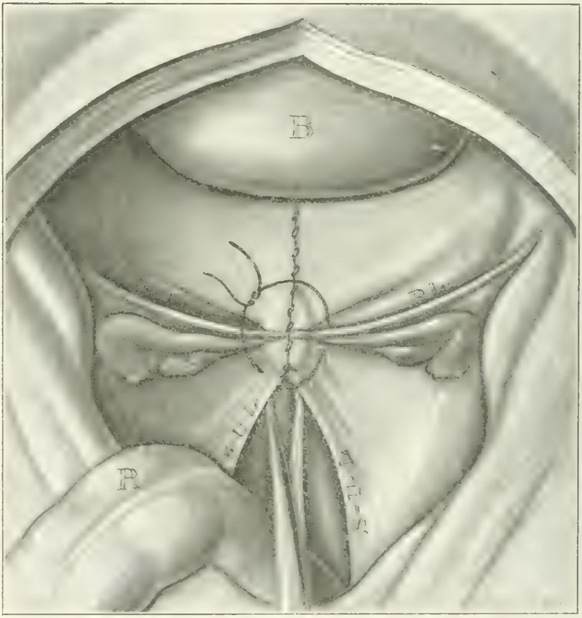

FIG. 7.—Uterus removed. Stumps of round and broad ligaments coaptated.

Dr. Polk presented the patient for examination at the conclusion of his paper.* Professor Pozzi, for the committee, submitted the following report:

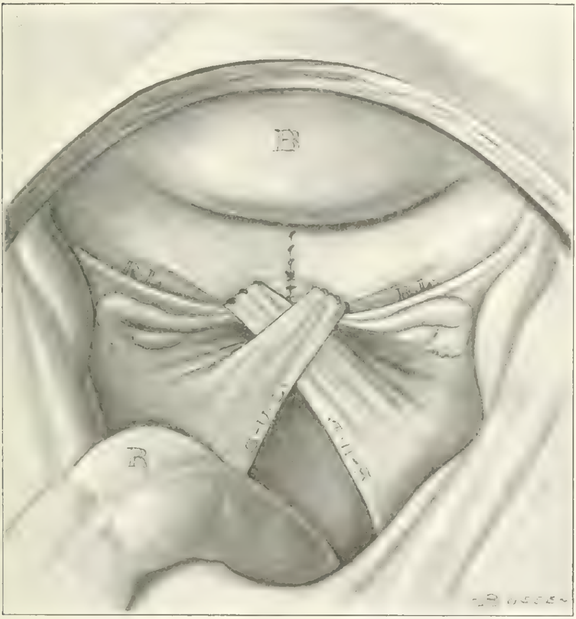

Fig. 8. Uterus removed. Utero-sacral ligaments thrown forward and crossed over stump.

New York, 27th of April, 1909.

I examined the case of procidentia uteri operated on by Dr. W. M. Polk by *Suprapubic Operation Upon the Pelvic Floor.* The patient was of a delicate complexion, about fifty or sixty years old. She had suffered for years and had been operated on about four months ago. I found that the vagina had a normal depth. Around the neck of the uterus was a plastic infiltration, but no pain by pressure. I think the result is excellent.

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*July 12, 1909. I examined the patient to-day, she being in the standing position. The plastic infiltration around the neck of the uterus has disappeared; in other respects the conditions are identical with those named in Professor Pozzi's report. W. M. P.

(Signed) Prof. S. POZZI,
Honorary Fellow of the
American Gynecological Society (*Paris*).

ANATOMICAL SUGGESTION.

In estimating the need for this operation it is best to view the anatomical conditions from the standpoint of the living subject rather than that of the cadaver, the principal reason for this being the fact that in the cadaver, owing to position as well as to the contraction of tissue which takes place, the space between the peritoneal and muscular (levator ani) layers (or surfaces) of the pelvic floor is materially lessened, the peritoneal face approaching the level of the muscle to a far greater extent than is witnessed in the normal living pelvis. This statement is borne out by the dissections which we have from time to time made upon the suprapubic aspect of the pelvic floor in connection with the requirements of hysterectomy and other forms of suprapubic operations upon the pelvic viscera. The peritoneal surface and the muscular surface (levator ani) of the pelvic floor may be said, speaking broadly, to start from the inner face of the pubic bone at about the same level. As we follow the general line of the two surfaces backward, however, they diverge and we find there is a gradually increasing depth in the space between them which is filled with fibro-connective tissue, which in turn presents throughout its meshes sundry lines of condensation of sufficient density and strength to serve as supports or ligaments to such structures as they accompany or to which they are attached. Muscular fiber analogous to that belonging to the outer coat of the uterus and vagina exists in some of them, notably the uterosacral and broad ligaments. The breaks in the peritoneal face of the floor are Douglas' culdesac behind, vaginal opening in the center, and the vesical region in front. The break at the vesical region conforms to the base of the bladder but it finds compensation in the close proximity of the puborectal division of the levator muscle, as it envelopes the vagina in its course backward to the perineum. That at the vagina is protected by support from the broad and uterosacral ligaments; the upper part of the broad and round ligaments belongs to the body of the uterus projecting above the plane of this floor, and gives but indirect aid at this opening. The break in the floor at the culdesac is for the accommodation of the rectum, but the uterosacral ligaments guard it. They represent the posterior confines of the peritoneal level of the pelvic floor, and their strength is sufficient to resist any direct pressure they may be subject to. They yield however to forward and downward traction such as comes from prolapse of the anterior pelvic floor, becoming thereby party to vaginal, and especially uterine prolapse. Just here it is pertinent to say that the break in this contour of the upper floor is compensated by the natural descent of the anterior rectal wall, which thus fills it with part of a self-supported viscus; and also by the relatively smaller degree of intrapelvic pressure to which it is exposed. The distance between the two principal floor layers, peritoneal and muscular, is here at its greatest. Measured by the sacral curve, it extends from the second sacral bone to the coccyx—the direct distance is shorter in proportion to the curvature of the sacrum. The breaks in the muscular layer of the pelvic floor are the urethral, vaginal and anal openings. The first may be ignored, of the remainder, the vaginal is of prime importance, but as our operation does not directly involve the muscular floor we stop at this mention of its openings. Both floor layers are swung from the pelvic wall, the peritoneal-fibro-connective, at a higher level than the muscular; both are convex downward, the muscular much more so than the peritoneal in consequence of which they are much farther apart at the median line than at the walls of the pelvis. The vagina extends directly through this median region, and closely associated with its lower anterior half we have the base of the bladder, the portion of that organ which, as we have said, occupies the break in the forward part of the peritoneal-fibro-connective layer of the pelvic floor.

Turning now to the condensations of this inter-lying fibro-connective tissue, we find they have an important bearing on the vagina and bladder.

The principal lines or areas of condensation are about the sides and posterior aspect of the uterovaginal junction (the vaginal break in the upper floor layer) and are known anatomically as the lower lines of the broad and the uterosacral ligaments; here you find the involuntary muscular fibers derived from the vagina and uterus, interwoven in such fashion as to add strength to the structures. As we descend, the condensation continues, being in part a continuation downward upon the vagina of both the uterosacral and broad ligaments, but it is to be noted that the actual support is much more direct to the lateral and posterior aspects of this viscus than to the anterior. This arrangement continues well below the bottom of the culdesac. The normal tonicity of the vagina, especially in non-parous women, compensates the anterior wall for this lack of direct support from this direction, but after the stretchings of child birth, particularly in the face of faulty involution, this part of the vagina must proportionately rely for support upon other and more direct lateral and anterior agencies to be now mentioned, viz.: An important line of this condensed tissue accompanies the ureters. It takes form as they pass through the base line of the broad ligaments at junction of outer and middle thirds, increases in thickness as it accompanies them to the bladder, assuming the proportions of an outer sheath, and thus running diagonally forward and downward through the fibrocellular inter-floor space, to right or left of the vagina. Here this sheath is attached by fibrous tissue connection in all directions, the best defined being towards pelvic wall, bladder and vagina. Similar condensations of tissue accompany all vessels going to and from the vagina, which means that such supports, for they are supports, are best defined laterally. A striking development of this nature accompanies the vessels of the bladder, as they leave the pelvic wall, and constitute a broad ligamentous structure, extending thence to top, to bottom, and to the lateral aspects of that viscus. Toward the base it extends so as to envelope that region well out toward the trigone.

If in connection with this description we recall the elongation all these lines of support suffer in prolapse, we realize the vital importance of an operation that will shorten them. An admirable illustration is furnished in the case cited, upon which the operation offered was performed.

Reference to the accompanying anatomical *Plate I* will help to explain the text. (The uterus and bladder are forcibly drawn upward.) The bladder is separated from the vagina as far as the trigone, the outline of the ureter is shown as it passes to the bladder The broad ligament as far down as basic line is cut from uterus, the peritoneum is removed from the exposed region and with it the round ligament. The extension downward upon the vagina of a continuation of the broad ligament is shown also, together with the outward extension of this structure to and behind the ureteral sheath. The outer attachment of the basic line of broad ligament is drawn up to show how a similar structure (which encloses the cystic vessels) runs forward and inward to envelope the bladder and lend support to ureter and indirectly to the vagina. The tissue invoked in the suturing anterior to the uterus is that lying between the vagina and ureter, and also that which is above and beyond the ureter. The uterosacral ligaments are the only tissues involved in the operation that are behind the uterus. They are out of this field, the one on the right side is hidden behind the remnants of the broad ligament.

7 East Thirty-Sixth St.

A CASE OF STRUMA OVARII.*

BY

ROBERT T. FRANK, A.M. M.D.,
Assistant Adjunct Gynecologist, Mt. Sinai Hospital.

(With three illustrations.)

Gottschalk in 1902 reported an ovarian tumor which he designated "folliculoma malignum ovarii." According to his views, the Graafian follicle was the point of origin of the growth. Both Kretschmar and Pick recognized the morphological similarity of Gottschalk's neoplasm with that of colloid struma, but interpreted the genesis of the ovarian growth dissimilarly. Kretschmar claimed that the thyroid tissue in the ovary was a metastatic deposit from the normal or abnormal thyroid gland, basing his observations upon the reports of Riedel, and of Oderfeld and Steinhaus who found metastatic deposits respectively in the jaw and frontal bone, originating from apparently normal thyroid glands. Pick, on the other hand, regarded the ovarian thyroid tumors as an atypical teratomata. This latter view has now been generally accepted.

The literature of the subject contains but twelve reports of "struma colloides ovarii aberrata," as Pick denominates these tumors, and several of the reports lack all detail. A point of clinical interest is the ultimate fate of the patients, subsequent to the removal of the growth. At least one of the patients died of metastases, though the majority appear to have remained well permanently.

The following is an additional case of struma ovarii:

R. N., Adm. No. 97099, admitted to the first gynecological division of Mt. Sinai Hospital, October 8, 1907, discharged October 26. The patient, twenty-two years of age, had been married eight months and never been pregnant. The general and menstrual history were negative. The sole complaints were leucorrhea and backache.

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* Presented at the New York Academy of Medicine, Section on Obstetrics, Feb. 27, 1909.

The general physical examination was negative—*no struma of the neck*. Locally there was found a retroverted uterus with an enlarged prolapsed right ovary. A curettage was first performed, and then the abdomen was opened and a tumor, the size of a peach, involving the right ovary readily removed (salpingooophorectomy). There were no adhesions and no ascites. Recovery was uneventful. I have seen the patient repeatedly since operation, and now one and a fourth years after operation she is still in perfect health with normal uterus and left ovary.

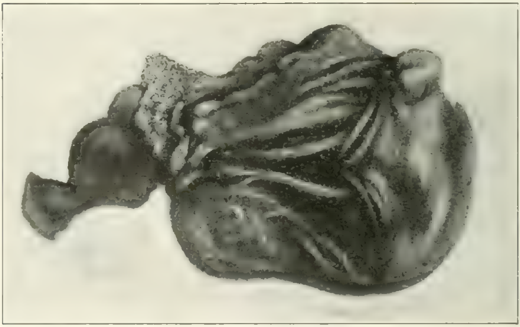

FIG. 1.—Tumor uncut showing tooth and below this a shell of bone. To the left is the tube and mesosalpinx.

The tumor was ovarian in shape, of irregular bossed appearance and enclosed in the thickened tunica albuginea. In numerous spots semitransparent cysts were visible through the fibrous coat. At one pole a hard bony shell was noted (Fig. 1).

On cross-section the growth was seen to be composed of irregular, somewhat angular cysts of greatly varying size, filled with a sticky (colloid) material. Dissection of the bony portion revealed a molar tooth imbedded in the tissues and connected with a thin, but hard bony lamella. At the opposite pole was a hemorrhagic dense area of oval shape about 1 x 2 cm. in size. The Fallopian tube and the broad ligament were normal (Fig. 2).

Microscopical examination of the growth revealed the following: The dense hemorrhagic area proved to be a corpus luteum with hemorrhagic infiltration. The hard shell was composed of normal bone showing Haversian canals. The tooth was not sectioned. The remainder of the tumor consisted of tissue identical with that of a colloid goitre. In some parts dense masses of thyroid acini of normal size were closely crowded, the lumen showing but small accumulation of colloid. In a few spots a slight tendency to atypical adenomatous growth prevailed. The greater part of the growth was formed by irregular cysts from microscopical size to 1 cm. in diameter filled with colloid material and lined with a single layer of low cubical epithelium. The cell outline was poorly defined, the nucleus oval or round and darkly stained. No test for iodine could be made on account of the method of preservation. Some of the cysts had numerous capillaries in their walls and rupture of the vessel wall had produced hemorrhages into the cyst lumen (Fig. 3).

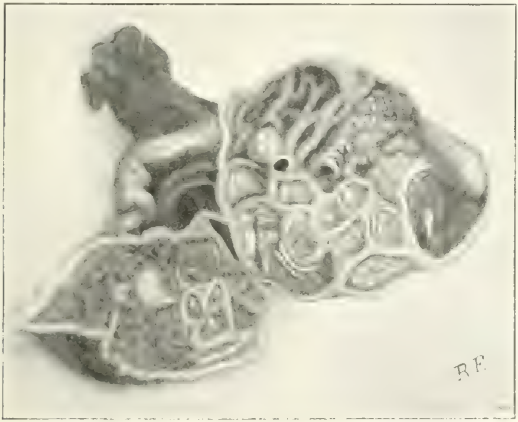

FIG. 2.—Tumor cut across showing thyroid tissue and colloid contents of acini.

Pick based his assumption of the teratomatous origin of the thyroid tissue upon the following facts: In twenty-one true dermoid cysts he discovered thyroid tissue in no less than six. Furthermore, the cases of Saxer, in which a tooth was found imbedded in an otherwise normal ovary, and later the case reported by Meyer, in which a lens was likewise found in an ovary, show that a single highly specialized tissue may be the sole evidence of a teratomatous growth. Pick also drew attention to the fact that metastases from the thyroid gland almost always are located in the bony skeleton. To suppose that thyroid metastases are found solely in teratomatous ovaries and nowhere else, requires an undue stretch of the imagination.

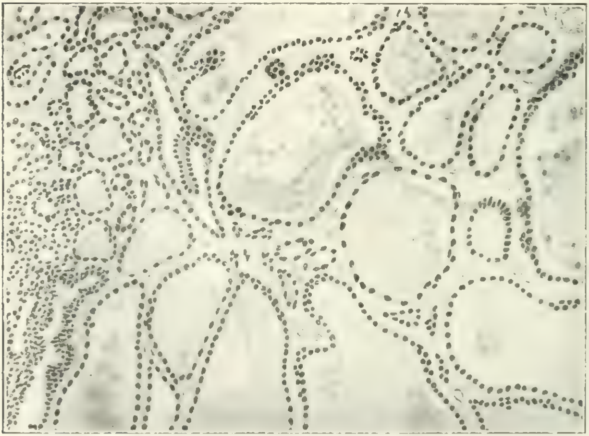

FIG. 3.—Section of tumor showing thyroid tissue with colloid contents of acini × 400 diameter.

From the appended table of cases it will be seen that the clinical facts are extremely meager. In several patients the tumor was accidentally discovered; in others ascites caused the patients to seek medical advice. The age varied from fifty-seven years to twenty two; some were parous, others had never born children. Ascites was present in nearly half the cases. The size of the tumor varied from that of a child's fist to that of a child's head. A fatal outcome is noted in only one instance, although most of the patients were not observed subsequent to operation. Two of Walthard's cases showed colloid struma of the neck, but no other observer has reported a similar coincidence.

The microscopical picture presented in struma ovarii is typical.

CASES REPORTED PREVIOUSLY.

Reported by	Age	Symptoms	Tumor	Outcome	Remarks.
Kretschmar. Verhandlung. deut. Gesellsch. f. Gyn., 1901.	48	Tumor; *ascites*; menopause 5 years before	Size of fist; adhesions, only thyroid tissue.	Death after 2 years	Considered *endothelioma* when first examined.
Gottschalk, S. *Berliner klin. Woch.*, 1902, No. 26.	48	Tumor, *ascites*	Size of fist, only thyroid tissue	Well 4 1/2 years later.	Considered "folliculoma ovarii malignum." No struma of neck.
Gloeckner, A. *Zentralbl. f. Gynä kologie*, 1903, No. 26.	57	Prolapsus, no ascites	Three times size of normal ovary; thyroid tissue, cartilage, sweat glands	Well 1 1/2 years later.	No struma of neck.
Meyer, R. Virchow's Archiv, 1903 vol. clxxiii.	55	Tumor, *ascites*	Size of large fist; thyroid tissue, bone, cartilage, muscle	?	Found iodine in tumor.
Walthard, M. *Zeitschrift f. Geb. u. Gyn.*, 1903, vol. l.	55	Tumor, menopause 1 year before	Size of large fist; thyroid tissue; stratified epithelium, sweat and sebaceous glands	Well 4 years later	Struma of neck.
Walthard, M. *Zeitschrift f. Geb. u. Gyn.*, 1903, vol. l. Case II.	33	?	Twice size of ovary, thyroid tissue, cartilage, ciliated and squamous epithelium	?	No struma of neck.
Walthard, M. *Zeitschrift f. Geb. u. Gyn.*, 1903, vol. l. Case III.	?	?	Size of large fist; only thyroid tissue.	?	Struma of neck.
Vagades. *Monatsschrift f. Geb. u. Gyn.*, 1903, vol. [illegible]	?	?	Size of child's head; thyroid tissue	Well 5 years later.	
P[illegible], O. *Zeitschrift f. Geb. u. Gyn.*, 1904, vol. [illegible]	50	Tumor; *ascites*	Size of child's fist; thyroid tissue, thymus (?)	?	Tumor had broken through its capsule.
Eversmann, J. *Archiv f. Gyn.*, 1905, vol. lxxvi.	33	Pain; no ascites	Size of child's head; only thyroid tissue	Well 2 years later.	
Ulesko-Stroganowa, K. *Monatsschrift f. Geb. u. Gyn.*, 1905, vol. xxii.	41	Abdominal pain for 2 years; *ascites*.	Size of child's head; only thyroid tissue	Well 8 months later.	Found other ovary unenlarged but containing thyroid also.

NOTE.—The reference to Lanz could not be verified.

The details in all cases agree. In certain spots almost normal thyroid tissue is found, but the greater part of the tumor shows a marked tendency to colloid accumulation and consequent cyst formation. Occasionally, more adenomatous proliferations are encountered, and hemorrhages into the cysts are not infrequent. Other tissues rarely form an appreciable bulk of the neoplasm. Bone and cartilage are the most frequent. Muscle fibers, sweat and sebaceous glands, goblet cells and ciliated epithelium have been reported. In my own case a well-formed molar tooth was noted. Several authors have reported cases on the border line between dermoids and teratomata, containing thyroid tissue—Anspach, Bell, etc.; in Ribbert's case the thyroid formed but a small part of the growth, which goes to prove that a gradual transition marks the change from a complex dermoid with thyroid tissue to so-called simple(?) thyroid tumors of the ovary.

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Saxer. Beiträge zur pathologischen Anatomie, vol. xxi.

Anspach. Proceedings of the Pathological Society of Philadelphia, 1903, November, p. 209.

Bell. *Journal of Gynecology and Obstetrics of the British Empire*, 1905, July.

Ribbert. *Deutsche medizinische Wochenschrift*, 1905, p. 1819.

983 Park Avenue.

A CASE OF DECIDUAL EXPULSION OCCURRING AT EACH MENSTRUAL PERIOD.

BY
OSCAR FRANKL, M. D.,
Vienna.
AND
JOSEPH J. SCROGGS, M.D.,
Beaver County General Hospital, U. S. A.

(With one illustration.)

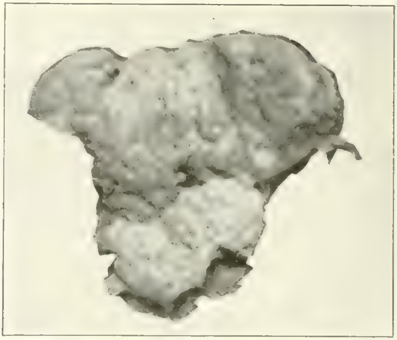
Cases of expulsion of large or small pieces of the mucosa uteri are not uncommon, and the literature on this subject is very rich. Dysmenorrhea membranacea has been well studied, both clinically and histologically. We find in these cases expelled parts of the mucosa varying in size from 1 to 5 or 6 cm., and of a thickness of from 3 to 6 mm., and sometimes a complete cast of the entire uterine cavity has been found. Schottländer contends that the membranes contain numerous decidual cells which are arranged in striæ, with many leukocytes; he finds many glands having low epithelial cells, also hemorrhages and detritus. An exhaustive paper on the subject has been written by Hitschmann and Adler, who think that the name endometritis exfoliativæ is not correct since there is no inflammatory condition present, the round cells being a part of the menstruation. They have never found round cells in the interval, but only in the premenstrual stage.

The earlier authors thought that dysmenorrhea membranacea was always caused by an inflammatory condition of the endometrium occurring at the menstrual period. Decidual cells are found in different parts of the membrane, and it is not possible to differentiate them from the decidual cells of pregnancy. One must understand that the stroma elements of the premenstrual mucosa very closely simulate the decidual cells of early pregnancy. In many cases a differentiation is impossible. In our case the characteristics of the expelled membrane are so marked that there is no doubt but that it is a true decidua of pregnancy.

The following is the history of a very interesting case.

A woman twenty-seven years of age had given birth to a child when twenty-four. Labor was normal. Since then she has had at her menstrual periods severe pains, simulating true labor pains and is relieved only after the expulsion of a cast-like membrane, as shown in Fig. 1. Before this membrane is expelled a bloody discharge begins. Her family physician states that he has attended her during three periods and that each time he has found a complete membranous cast of the uterine cavity. The surface of this cast is finely granular. On opening the cast one sees both tubal cornua and that the internal surface shows large and small granular elevations; the thickness of this membrane is more than 1 cm. The patient was under our observation during two menstrual periods and each time she expelled a membranous cast and suffered severe labor like pains.

The histologic examination shows a marked decidual formation. We see the differentiation both in the spongy and compact layers, the decidual cells are generally round and sharply defined, show a glass-like protoplasm, and round and deeply staining nuclei. In other places the decidua cells have lost their homo geneous protoplasm, the protoplasm being cloudy and the decidua cells becoming spindle-shaped. There is always a diffuse infiltration of round cells, but there are some islands where the round cells are very compact and cover entirely the decidual elements. Many of the blood-vessels show thromboses, also the blood sinuses of the spongy layer show thrombosis. Plasma cells were not to be found, although Pappenheim's specific staining method was used. Though we know that some lymphocytes are to be found in every decidua, we think that in our specimen the diagnosis of an acute inflammatory condition is to be made on account of the islands of lymphocytes, no parts of an ovum were found and no chorionic villi at all. The whole specimen shows in all parts the constituents described before, and nowhere could any glands be found.



Decidual cast.

How is this case to be explained? Certainly, this membrane is not one as found in the cases of dysmenorrhea membranacea, but a true decidua. It is a product of a pregnancy, although no part of an ovum was found. Surely, we have a case in which the patient at her menstrual time expelled the decidua caused by an inflammatory condition of the uterine mucosa. Apparently the ovum died each month in the first stages of its development. The woman admitted that she cohabited with her husband just after her menstrual period and therefore must have been impregnated immediately. The ovum died during the first days, but the decidua remained in the uterine cavity until the time of the next menstruation. At the time of the physiologic menstrual wave the separation of the decidua from the uterine wall began, in which the thrombosis of the blood sinuses perhaps helped, and it was then expelled by the uterine contractions. The after-history of the patient is not known as she did not remain under our observation. We might add that her family physician made a curettement after the expulsion of the second cast when under his care, but without any result. We advised her not to cohabit for some months and to be treated during this time for the endometritis. We would have dilated the cervix and treated the mucosa antiseptically, but the patient was lost sight of.

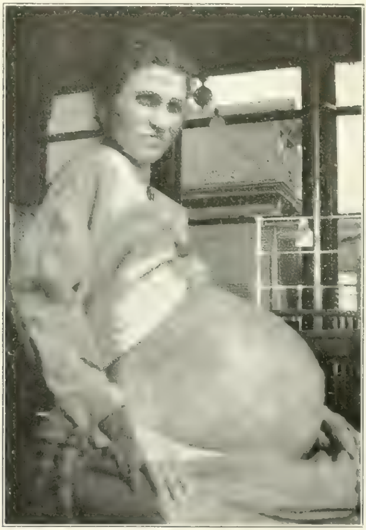
REMOVAL OF AN UNUSUALLY LARGE OVARIAN CYST.

BY
STEPHEN H. KNIGHT, A. M., M. D.,
Surgeon to Grace Hospital,
Detroit, Mich.

(With one illustration.)

On January 20, Mrs. G., a Hungarian, was admitted to Grace Hospital. She had been treated for dropsy by her physician outside of the hospital and, as she did not receive any benefit, was sent to the hospital. Her abdomen was large, protuberant, and presented the appearance of an enormous ovarian cyst. Vaginal examination confirmed the diagnosis and she consented to an operation. She said the tumor had been growing ten months. On January 23, her temperature was 102°, pulse 116, respiration 28. A blood count showed red 3,678,500, white 10,500, hemoglobin 80 per cent. Urine contained a slight trace of albumin, specific gravity, 1012, numerous pus-cells, faintly alkaline. She had had one child.

She was operated on January 26. It had been suggested that part of the fluid be drawn off at first and the patient allowed to recover before the final operation. It was decided, however, to do the operation at one stage. An incision was made through the thin walls of the abdomen down to the tumor, and when the trocar was thrust in a quantity of clear ovarian fluid escaped. The tumor proved to be multilocular adenoma and some of the daughter cysts were filled with a thin pea-soup-like fluid. When all the fluid possible had been drawn off there was still a large solid mass left wedged up under the diaphragm. To remove this it was necessary to carry the incision above the umbilicus. The abdominal wall was so stretched that I was obliged to make a tuck in it, and sewed together a wide area of peritoneal surface on each side of the incision. A very large pad was made and placed over the abdomen in order to partially continue the intra-abdominal pressure, and a bandage placed lightly over it. Two quarts of saline infusion were given the patient during the operation and she came out from the anesthetic with very little shock. Immediately following the operation, her temperature was 97.8, pulse 112, respirations 28. Next day, January 27, 100°, 120, 36. January 29, 98.6, 96, 28. The wound healed by first intention and she left the hosptial on the thirty-ninth day.



Large ovarian cyst.

The fluid part of the tumor collected amounted to 96 pints. The solid part of the tumor weighed fifteen pounds. The whole together weighed 111 pounds. The patient herself weighed eighty-seven pounds when she left the hospital.

ABDOMINAL MYOMECTOMY FOR LARGE UTERINE FIBROIDS.

BY
H. P. KUHN, M. D.,
AND
W. J. FRICK, M. D.,
Kansas City, Mo.

(With two illustrations.)

THE treatment of fibroid tumors of the uterus resolves itself into either a radical procedure involving the sacrifice of that organ or some form of extirpation of the myoma leaving the organ intact.

Other methods of treatment, including the medical, electrical, etc., have been discarded either for failure to cure or danger to the patient. At the present time, the consensus of opinion for the treatment of fibroids is about two to one in favor of some form of hysterectomy.(1)

In a review of the recent literature and from personal experience, we are convinced that simple extirpation or myomectomy should take a wider field.

Myomectomy is to be contrasted with hysterectomy not only in that it leaves the uterus intact and capable of pregnancy, but conserves important rectal and bladder supports. Hysterectomy at its best sacrifices all chances of maternity, and unless some of the modified methods of high amputation are undertaken leaving an ovary, the climacteric is precipitated. We believe that an artificial menopause is no more troublesome than a normal one, yet it is a condition, to say the least, unnatural.

It is unfortunate that in dealing with fibroid we have a disease for which we do not know the cause. Whether a fibroid is to be regarded as a fibrosis similar to the change in the prostate in the male,(2) whether it is a developed Cohnheim area,(3) or whether it bears the same relation to a terminal blood-vessel as neuromata to epineurium(4) would to some extent determine radical or conservative treatment. Herein will lie the great objection to myomectomy, for not knowing the etiology, we do not know the chances of recurrence.

An average of statistics show that 21 per cent. of all gynecological patients have fibroid.(5) This pronounced tendency to fibrosis might remain after enucleation of all growths. It is difficult to draw a conclusion from postoperative statistics, as there are so few reports. A. Martin had two cases recur out of ninety-six.(6) The German authorities give 6.4 per cent. of recurrence.(7) C. P. Noble had no recurrence in sixty-six cases.(7) The fact there are so few reports would argue in favor of nonrecurrence. It would appear that this danger of recurrence is relatively slight since the growth of these tumors is slow, these cases would tend to reach the menopause and the fibroids retrogress before they were large enough to give symptoms.(8)

Other advantages aside, that of pregnancy is the most important. Following myomectomy, we have Winter's and Noble's statistics. Winter's series comprised twenty-eight cases of subserous, submucous, and interstitial fibroids, of which six became pregnant. (9) C. P. Noble (7) had, in forty-four vaginal myomectomies, one pregnancy, and in twenty-two abdominal, two pregnancies. Taking Winter's high percentage and Noble's low in ninety-four myomectomies, we have nine pregnancies, or 10 per cent. This rather low per cent. is worthy of consideration with the other factors in favor of myomectomy.

The postoperative sequelæ of myomectomy are of no small import. There is no prolapse of the bladder and resulting cystitis as in hysterectomy. The most important anterior supports of the rectum and sigmoid are not disturbed and rectal prolapse is not so likely.(10) Vaginal hernia and general visceral prolapse into the empty pelvis as well as secondary atresia of the vagina are prevented.(11) Myomectomy is a rapid operation with a trivial loss of blood, no shock, and an easy convalescence.

The danger of overlooking malignant disease of the body of the uterus is an important *desideratum.* There is no doubt that carcinoma of the body of the uterus and fibroid have some intimate relationship since 5 per cent. of all cases of fibroid have accompanying carcinoma of the body or have it develop later in the cervical stump.(12) Noble states that the frequency of carcinoma of the body of the uterus increases twenty six times in the presence of fibroid.(7) There appears to be no relationship between carcinoma of the cervix and fibroid.

Even though carcinoma be not present in the body or cervix, we are confronted with the fact that in patients where supravaginal hysterectomy has been done, they have died later of a malignant disease of the cervical stump.(13) Winter, Manton, and Noble report cases of malignant disease of the cervix as common after supravaginal hysterectomy.(14) Pichelot reports three cases of cancer of the cervix occurring in fifteen cases where he had done supravaginal hysterectomy.(15) Lisobré states that it is an unquestioned fact that the cervical stump is prone to degenerate.(16) If these cervical stumps are so frequently the seat of degeneration, we must question the value of supravaginal hysterectomy. There remains, then, but the two extremes of uterine surgery—panhysterectomy and myomectomy. By assuring ourselves that there is no accompanying malignant disease, myomectomy must more often be considered.

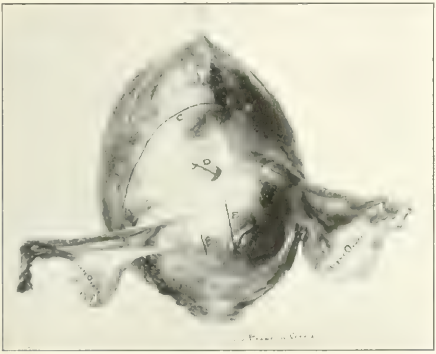


Fig. 1. Posterior view of myomatous uterus showing five fibroids. Probe in cervix.

The so-called degenerations of fibroids into sarcoma are rare. Von Franque found it to occur in from 1 to 3 per cent. of his cases; Fehling in 2 per cent., and Noble in 2,274 cases only 1.4 per cent. The clinical significance of this is of no great importance except in that it offers for removal of the fibroid wherever it is discovered.(17)

The technic of myomectomy is simple, but should be carefully carried out in its steps. With the patient in the Trendelenburg position, the abdomen is opened in the median line with an incision long enough to deliver the uterus. The intestines are walled off and the uterus surrounded with gauze pads secured with a tape and hemostat. The assistant grasps the cervical portion with the gloved hand and by compression controls the blood-supply. If this method is not possible, especially where the uterus cannot be delivered, Moynihan clamps after the method of Hertzler(18) are applied. Sometimes the hemorrhage can be controlled by a gauze pad rolled in the form of a rope and tightly compressed about the neck after the fashion of a tourniquet. In fibroids of the submucous variety or where they are situated well beneath the surface of the uterus, the incision is made over the most prominent part of the tumor.

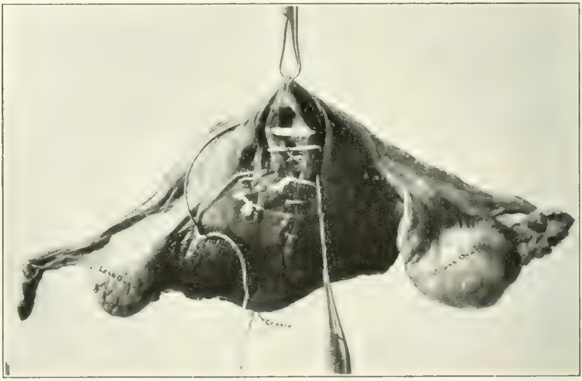


FIG. 2.—View after myomectomy showing closure of uterine incision with the cross stitch. Heavy silk used for illustrative purposes. Match holds incision apart to show stitch.

In the pedunculated growths, the incision is carried in an ova about the base. The tumor being exposed, blunt dissection with the knife handle or with Kelly's crenated myomectomy enucleator readily lifts the growth from its bed. This is easily accomplished. Should there be any efferent vessels running into the tumor, they are ligated. The control of the blood-supply is now loosened so that any free bleeding from the cavity can be stopped. The surplus uterine tissue is trimmed down. It will be noticed that the uterus contracts after enucleation of the deeper-seated myoma and care must be taken not to trim off too much tissue else the edges will not proximate evenly. If the endometrium is torn, it is repaired with a running suture of No. 0

iodized catgut. The cavity is again inspected for free bleeding and the interrupted figure-of-eight hemostatic suture of No. 1 iodized catgut is placed about one-half to one-quarter inch from the margin of the incision deep into the tissues of the uterus. With this method the edges usually approximate accurately. To further close the incision, running suture of No. 0 catgut is placed in the peritoneal coat. After we are satisfied that no more myoma exist, the uterus is dropped back into the pelvis.

Occasionally it is necessary to plicate the broad and round ligaments to take up slack in these supports.(19) The abdomen is closed in layers with No. 0 and No. 1 catgut.

Case I.—Mrs. R. McA. Aet. 29. No children. There was no typical history of fibroid. Patient herself noticed a gradual enlargement of the abdomen. Rather profuse menstrual periods.

Operation.—Uterus found to be symmetrically enlarged. A submucous fibroid five inches in diameter was enucleated from the fundus. A considerable amount of thinned-out uterine tissue was resected to close the cavity left by the fibroid. The uterus was closed in the usual manner and the abdomen without drain.

Postoperative.—Patient left the hospital in two weeks with an uneventful recovery. Twenty-two months later she has gained twenty-five pounds and is in good health with normal menstrual periods.

Case II.—Mrs. D. S. Aet. 31. No children. Patient has had hemorrhages lasting for fifteen days at each menstrual period. Lost considerable weight.

Operation.—Uterus was found to be covered with small fibroids. These were subserous and intermural and readily enucleated. One large fibroid the size of a grape fruit was enucleated from the fundus of the submucous, intermural variety. The uterine incisions were closed in the usual manner and the abdomen without drainage.

Postoperative.—Recovery was uneventful, patient leaving the hospital in two weeks. Twenty-four months later she has gained twenty pounds and her menstrual periods are normal.

Case III. Mrs. W. Aet. 40. No children. Patient has had a uterine tumor for fifteen years with recent pressure symptoms. She is in critical condition at time of operation from vomiting and pressure sumptoms.

Operation.—Abdomen rapidly opened from ensiform to pubes. A large pedunculated fibroid filled the entire abdominal cavity. This was delivered from the abdomen and a wedge-shaped incision involving its base made in the fundus. The uterine incision was rapidly closed and the abdomen with through-and-through suture. She rallied and made a rapid convalescence.

Postoperative.—Twenty-eight months later she has gained forty-three pounds and has no symptom referable to the pelvis.

CASE IV.—Mrs. H. S. Aet. 45. One child. Menstrual periods have been two weeks apart for three years. Nodular mass palpated in pelvis.

Operation.—One subserous fibroid size of a billiard ball at the cervix and a submucous fibroid size of a walnut enucleated at the fundus. Uterus and abdomen closed in the usual manner.

Postoperative.—Sixteen months later patient has gained weight and has normal menstral periods. Approaching the climactery.

CASE V.—Miss M. S. Aet. 25. No children. Rather profuse menstrual periods with considerable dysmenorrhea. Fibroid discovered at operation for acute appendicitis three months before.

Operation.—Uterus was found to be symmetrically enlarged. A fibroid of the submucous variety size of a billiard ball enucleated from the fundus. The tumor was solitary. The uterus was closed in the usual manner and the abdomen without drainage.

Postoperative.—She left the hospital in ten days with no complications. Nine months later she is having no hemorrhages, no dysmenorrhea and is gaining weight.

CASE VI.—Mrs. A. D. Aet. 39. No children. Patient has had hemorrhages for two years with an increasing tumor in the pelvis.

Operation.—One fibroid size of a billiard ball at level of the internal os, posterior, of subserous variety readily enucleated. Another the same size at the fundus of the submucous type was removed with some of the endometrium. This was repaired with No. 0 catgut and the uterine incisions and the abdomen closed in the usual manner.

Postoperative.—She made a rapid convalescence leaving the hospital on the tenth day. One year later she has no symptom referable to the pelvic cavity.

CASE VII.—Mrs. A. G. M. Aet. 49. No children. Patient came in for operation for chronic appendicitis. No history of fibroid.

Operation.—Adherent appendix removed. Uterus was symmetrically enlarged. Fibroid size of an orange enucleated from the body of the uterus. Usual uterine closure and abdomen without drain.

Postoperative.—Convalescence uninterrupted leaving hospital at end of second week. Patient has been lost sight of.

CASE VIII.—Mrs. G. Aet. 43. No children. Severe hemorrhages for six months. No evidences of carcinoma from uterine scrapings.

Operation.—A submucous fibroid five inches in diameter removed from a uterus symmetrically enlarged.

Postoperative.—Patient left the hospital in two weeks. Ten months later she is having no hemorrhages and is gaining weight.

Case IX.—Mrs. P. Aet. 40. No children. Patient gives a history of pain and hemorrhages for six months.

Operation.—One subserous fibroid and two submucous fibroids averaging two inches in diameter removed from fundus and cornua of uterus. The uterine incisions were closed in the usual manner and abdomen without drain.

Postoperative.—Patient left hospital in two weeks and one year later she has gained weight and has no symptoms referable to the pelvic cavity.

Case X.—Mrs. A. L. K. Aet. 40. Two children. Patient has never been well after second baby ten years ago. Severe hemorrhages for two years.

Operation.—Six small fibroids enucleated averaging one inch in diameter. Three of these were submucous and the others subserous and pedunculated. Uterus looked like a honeycomb before suturing incisions.

Postoperative.—Patient made an uninterrupted recovery and left the hospital in two weeks. Three months later she is having a normal menstrual period and has no symptom referable to the pelvis.

Summing up these reports, we find there was a wide selection of cases, both as regards age, type of fibroid, and complications. In every case the operation was entirely successful in relieving the symptoms and the treatment seemed to have resulted in a cure. In some of the cases, the operation was practically a Cesarean section, while in others it was more simple. In either type of operation, the result was good and the convalescence as prompt. We have in no case any cause to regret the procedure.

The literature gives such widely divergent views as to the curative value of myomectomy that perfection of technic must enter into the estimate. Winter cures 73 per cent. of his cases.(9) Noble has a higher percentage.(20) Sutton and Giles hold that the after-effects of myomectomy are admirable.(21) Howard Kelly has good results and considers supravaginal hysterectomy in women under forty too radical a procedure if it can be avoided.

A recent complication by J. H. Carstens of fibroids complicating pregnancy of 498 cases in the literature up to January 1, 1908, gives a percentage of recovery of 0.8 per cent. favorable to myomectomy over some form of hysterectomy.(22)

The older literature, as a rule, gives a rather unfavorable mortality as compared to hysterectomy. J. N. West holds that it is a more dangerous operation than hysterectomy.(23) J. M. Baldy has had no deaths.(24) The Johns Hopkins reports up to 1906 have a mortality of 4.5 per cent. as compared to 3.1 per cent. for hysterectomy.(20) These percentages only show that the personal factor in selection of cases and perfection of technic determines the mortality.

Authorities differ somewhat on the selection of cases suitable for myomectomy, but that of Howard Kelly includes those most generally embodied.(25)

Myomectomy should be preferred to hysterectomy in women under forty where there are no complication, septic tubes or pelvic disease. In women over forty where the tumor is not enlarging and the menopause is distant, myomectomy is the operation of choice. If the fibromata continue to grow after the climacteric, hysterectomy is indicated, for it is in these cases that we have the highest percentage of carcinomatous degeneration, 64.9 per cent.(26)

CONCLUSIONS.

Myomectomy is especially indicated in women under forty where the genital tract can be left intact.

The limits of myomectomy should be extended under proper technic to cover part of the field of supravaginal hysterectomy. Myomectomy is the operation of choice for fibroids of the lower uterine segment in pregnancy.

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Keith and Perry Building.

THE AIR OF THE OPERATING-ROOM AS A POSSIBLE FACTOR IN THE INFECTION OF WOUNDS.*

BY
HUNTER ROBB, M. D.,
Professor of Gynecology, Western Reserve University; Visiting Gynecologist to the Lakeside Hospital,
Cleveland, Ohio.

With a perfected technic it would be possible to prevent the access of any pathogenic organism into operative wounds. To the attainment of such perfection there are numerous hindrances, but with the majority of these we have been able to cope and avoidable infections are growing every year more rare. Whereas in former times it was taught that all infections were propagated through the air, not a few authorities now state that no pyogenic organism has ever been obtained by culture methods from the air of the operating-room. Personally, I believe that this statement goes too far, as under certain circumstances we have been able to demonstrate their presence.

According to Flügge, the supposition that no germs enter the air from liquids or moistened surfaces holds good only so long as the surface of the liquid remains unmoved and intact. A moderate wind (of a velocity of four meters to the second) suffices to set free germ-containing droplets from the surface of water, moist articles, and the like. In closed apartments droplets are set free more frequently than is generally supposed during sprinkling, washing, manipulating wet linen, and—what is of special importance— during speaking, sneezing, and coughing. These germ-bearing or germ-free droplets, as Flügge has further demonstrated, are carried by the slightest current of air for considerable distances not only in a horizontal, but also in a vertical direction. In order to demonstrate the dissemination of such droplets during speaking, coughing and sneezing, Flügge had the person under observation introduce into his mouth a suspension of B. prodigiosus. The tests gave positive results. The plates exposed at a distance of several meters became covered with the characteristic colonies and remained sterile only after quiet speaking in a low tone.

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*Read before the American Gynecological Society, April 22, 1909, at New York.

With regard to the dissemination of desiccated germs, naturally only those diseases are transmitted in this way whose exciting agents are capable of surviving in the dried state. Thus Max Neisser (quoted by Harrington) concludes that dust infection is impossible with the organisms of diphtheria, typhoid fever, cholera, plague, and pneumonia, but possible with Staph. pyog. aureus, B. pyocyaneus, B. anthracis, B. tuberculosis and Meningococcus.

Sternberg says: "If we have on one side of our laboratory a dusty street and on the other a green field, more bacteria will naturally be found when the wind blows from the direction of the street than when it comes from the opposite direction; or if the air is filled with dust we may expect to find many more than when the room has been undisturbed for some time." Graham Smith investigated the air of the House of Commons and found no organisms pathogenic for man and only a few that were pathogenic for animals.

Prof. Wm. H. Welch says: "As compared with contact infection, infection of wounds from the air is of minor importance, but surgeons are not agreed as to whether or not the dangers of air infection are so slight that they need not be taken into consideration at all. At present there is again a tendency to pay more attention to the possibilities of infection from this source and some surgeons have even gone back to the spray." Haegler (quoted by Welch) found staphylococci and streptococci in the majority of his examinations of the air in wards and operating-rooms of the hospital in Basle, and the number of such cocci was in general proportionate to the opportunity for entrance into the air of cocci from dry material and to the amount of dust stirred up by movement in the room. Haegler concludes from his investigations that the danger of infection from the air is greater than is assumed by many surgeons.

Waring, investigating the air of the operating theater and certain wards of St. Bartholomew's Hospital, isolated only two pathogenic organisms—Staph. pyog. aureus and albus. In Coborn ward, however, into which cases of erysipelas are admitted, he found Strept. pyogenes.

Our present research was undertaken in order to find out whether by any special preparation of the operating-room the number of living bacteria that might be present in the air could be minimized. Furthermore, we wanted to find out whether it would be a safe procedure to employ an electric fan in the operating-room during operations in the hot summer days, since all of us know what a boon this would be, provided that the safety of the patient and the preservation of a good technic would allow of it.

The present report is merely a preliminary one, since, although a great deal of work has been done, the facts at hand as are yet insufficient for the purpose of drawing any definite conclusions.

The technic that we employ in the gynecological service of the Lakeside Hospital in Cleveland in dealing with our operating-rooms immediately before and after an operation is as follows: After an operation the floor, tables, hand basins, and other receptacles are washed with gold dust or Gibson's powder. (If the receptacles are blood-stained they are also washed with Labarraque's solution.) The floor is then washed with soap and water, then with plain water, and finally is mopped dry. On the morning of the operation the floor, woodwork, and all utensils in the room are wiped, and then washed with soap and water. After the floor has been mopped with a 1–1000 bichloride solution, the tables, hand basins, etc., are washed with a 1–20 carbolic acid solution. After everything is in readiness in the operating-room the floors are mopped again with a 1–1000 bichloride solution. It is our rule never to operate knowingly upon a pus case in our main operating-room. Such operations are performed in a special room set aside for this purpose. If we accidentally met with pus during an operation in the main operating-room, no further operations are carried out in this room on that day, and before the room is used again the floor, furniture, and wash-bowls are carefully washed with soap and water and a 1-20 carbolic solution.

In carrying out these experiments we have tried to notice whether the differences in the methods of preparing the room caused any perceptible and constant difference in the number of bacteria falling per minute upon the plates, and to discover whether any pathological forms were present. The general method was to expose during an operation solidified agar-agar plates. In some cases twelve were employed, in others twenty, but the total time of exposure was the same for each series. The plates were incubated for forty-eight hours and the colonies then counted. Later cultures were made from the colonies and the different varieties were identified as far as possible. When a given variety could not be identified, injections were made into guinea-pigs, rabbits, or mice to test for pathogenicity.

The factors taken into consideration were: The condition of the walls and of the floor, and whether the electric fan was or was not running.

The experiments were divided into the following series:

Series A.—The floor was washed with a 1-1000 bichloride solution.

Series B.—The floor was washed with a 1-20 carbolic acid solution.

Series C.—The floor was washed with plain water.

Series D.—No preparation of the floor.

Series E.—Experiments in rooms other than the gynecological operating-room; no preparation of the floor.

In each series one set of plates was exposed while the fan was running and another set when the fan was not running. In our inoculations we used 1 c.c. of a twenty-four-hour (or a forty-eight-hour) bouillon culture, which we injected into the muscles of the back.

RESUME OF EXPERIMENTS.

Series A, No. 1.—Floor washed before operation with a 1-1000 bichloride solution.

In these twelve plates were found eighteen different varieties of bacteria and we were able to identify nine varieties, three others being traced to their groups. The remaining five varieties were tested (by inoculation into white rats) and were found to be nonpathogenic. No pathogenic organisms were found.

On ten of the twelve plates Bact. rhodochrom; on six of the twelve plates Sarcina aurantiaca was found. All the plates with one exception contained Sarcina lutea. On three plates B. subtilis was found. Moulds were not very common, one or two occurring on each of five plates of the twelve.

It was observed that the plates exposed near the head of the table contained a great many more bacteria than those exposed at other parts of the room. This is probably due to the fact that there was more motion of the air in that part of the room.

In all of these experiments the average falling on each plate per minute was 4.08. This was determined by counting the total number of colonies on all the plates and dividing this number by the sum of the number of minutes each plate was exposed. Total colonies: 2885 ÷ 705 minutes = 4.08.

Series A. No. 2.—Floor washed before operation with a 1–1000 bichloride solution, and electric fan set in motion.

The conditions under which these plates were exposed were the same as in series A, No. 1, except that in this case the fan was running, and the plates were exposed toward the close of the operation, *i.e.*, when the wound was being sewn up. No pathogenic bacteria were found. The total number of colonies on all the plates was 2778. Dividing this number by 710, the number of minutes of exposure, and our number of bacteria per minute was 3.9. In the first series without the fan, the number was 4.08. Thus we see that the number of bacteria falling on the plates was slightly less with the fan running. In testing pathogenicity we inoculated guinea-pigs with 1 c.c. of a twenty-four-hour bouillon culture of the bacteria injected under the skin of the back, but obtained no local or general reaction.

Bact. rhodochrom was found on eleven out of twelve plates; Sarcina lutea on eleven; moulds on eight plates; Bact. arborescens on seven plates; B. subtilis on eight plates; Actinomyces on eight plates; Nonpathogenic, dot-like, white colonies on eight plates; B. gemmus on six plates; Micrococcus simplex on eight plates; Streptococcus mirabilis on one plate; M. alvi on one plate; B. liquefaciens on two plates; belonging to Bact. ambiguum group, one on one plate. The total number of different varieties was thirteen.

*Series B. No. 1.**—The floor of the operating room was washed with a 1–20 carbolic acid solution.

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* It must be borne in mind that after the use of the bichloride and carbolic acid solutions on the floor enough of the chemicals might be carried with the dust to inhibit the growth of the bacteria that settles on the Petri plates.

The total number of colonies falling on all the plates was 461. Dividing this by 710, the total time of exposure, we get 0.65 colonies per minute. With the first series of plates the number of colonies per minute was 4.08. The total number of varieties found was twelve and by inoculations into guinea-pigs and white rats we found that all were nonpathogenic. None of the guinea-pigs or rats showed even a local reaction. In this series Sarcina lutea was found most commonly, being on all of the twelve plates; B. subtilis was found on ten out of twelve; Moulds on ten out of twelve; Bact. rhodochrom on five plates; Micrococcus cumulus on eight plates out of twelve; B. proteus vulgaris on five plates; Micrococcus citreus on four plates; M. simplex on seven plates.

Series B, No. 2.—Floor washed with a 1-20 carbolic acid solution, fan running.

The conditions under which this series of plates was exposed were as nearly as possible the same as in the other series. The exposure was begun near the close of the operation, when the wound was being sewn up. The total number of colonies was 1707; the number per minute 2.04. This number is greater per minute than we had in the series when the fan was not running, but it is smaller than in either of the bichloride series.

In this series no pathogenic organisms were found. Our four series seem to show that there are fewer bacteria in the air when carbolic acid is used than when bichloride is employed.

Series C, No. 1*—No preparation of the floor. Fan not running.

The conditions under which this experiment was performed were about the same as before, twelve plates being used. On account of the fact that no antiseptic was used upon the floor the number of bacteria was much increased, so much so, in fact, that a differentiation into varieties would apparently have been impossible. We therefore decided to expose more plates for a shorter length of time each, but making the total time of exposure the same.

A total of 13,916 colonies fell on the twelve plates in 730 minutes, making 19.6 colonies per minute, many more than in the series in which antiseptics were used upon the floor.

Series C, No. 2.—Nothing on floor. No fan running.

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*In the remaining series (as shown by our protocols) in addition to the organisms that have been mentioned the following were found. M. flavus, Staph. albus, Bact. fulvum, Streptothrix, M. candidus, B. aurescens. B. pyocyaneus, B col. commun.

The conditions under which this series of plates were exposed were as nearly as possible the same. The exposure lasted practically through the whole duration of the operation, which, however, was rather short. On account of the large number of colonies which had grown out on twelve plates exposed in Series D, No. 1., we decided to expose a great number of plates, each one for a shorter length of time, but so as to make the sum total of exposure time the same. The total number of colonies was 10,105, the number per minute of exposure being 14.2. As will readily be seen, the number was much greater than when the antiseptic was used upon the floor.

In this series no pathogenic organisms were found.

There were thirteen varieties, numbered from A to M inclusive. Of this number, eight were identified. These five unidentified varieties were tested on guinea-pigs. In no case was there any reaction whatever.

Series D, No. 1.—Floor cleansed with water after the walls had been cleaned. Fan running.

The conditions under which this series of plates were exposed were inadvertently somewhat different. After the exposure it was learned that some three or four days previously the housekeeper had had the walls and ceiling washed. The floor had been washed with plain water. The fan was running during the entire time of exposure. Here again the number of plates exposed was twenty, the total exposure time being 710 minutes, as in each of the other series. It will be seen that the number of colonies was the smallest found in any series, in spite of the fact that the floor had been cleansed only with water and that the fan was running. The average was .32 colonies per minute.

In this series no pathogenic organisms were found.

There were eleven varieties, numbered (including duplicates) from A to M. inclusive. Of this number six were identified; three were traced to their groups; and two were not identified. Of the doubtful ones, none were pathogenic for guinea-pigs. In no case was there any reaction whatever.

Series D, No. 2.—Floor was not prepared; three weeks previously the walls had been cleaned. Fan running.

The conditions under which this series was exposed was practically the same as for Series E, No. 1, except that a longer period of time had elapsed after the walls had been cleansed. The floor received no preliminary preparation whatever. The fan was running during the entire time of exposure. Here again the total number of plates exposed was twenty, the total exposure time being 710 minutes. The number of colonies falling on the plates per minute of exposure was the smallest with any series up to date. The average was .02 colonies per minute.

In this series no pathogenic organisms were found.

There were only six varieties, and only fourteen colonies on the entire twenty plates. Of the different varieties, two were identified, and four were not. The latter were not pathogenic for guinea-pigs.

Series E, No. 1.—Exposed in pus operating-room. Fan running. Floor with absolutely no preparation. The walls had been cleaned within two or three weeks previously.

In this series twelve plates were exposed, the total time of exposure being the same as for the preceding series, 710 minutes.

The floor had had no special preparation, and for some time had had no preparation or care except an occasional mopping. The fan was running during the entire time of exposure.

The number of colonies which fell during this time was 105, the average number falling per minute being .15, somewhat more than in the preceding series.

Six varieties of organisms were found, exclusive of moulds. Of these four were identified. The remaining two did not prove pathogenic for guinea-pigs when 1 c.c. of a forty-eight-hour culture was injected under the muscles of the back.

One interesting thing about this series is that B. pyocyaneus appeared on one plate, which was exposed under the sink. This organism was typical in every way, but though cultures were injected into the peritoneal cavities of a rabbit and a guinea-pig, no ill effect was noted.

Series E, No. 2.—Exposed on Sunday, February 7, 1909, in different parts of pit in the surgical amphitheater. The walls had not been washed for some months. The floor had had only the ordinary preparation—a mopping with water. Fan running. No operation. Twelve plates exposed. Total exposure time, 710 minutes. Total number of colonies on twelve plates, 2.

Series E, No. 3.—Exposed on Sunday, February 7, 1909, in different parts of pit in the surgical amphitheater. The walls had not been washed for some months. The floor had had only the ordinary preparation—mopping with water. Fan running. No operation and scarcely any movement of air in the room Twelve plates exposed. Total exposure time 710 minutes. Total number of colonies on twelve plates, 1.

Series E, No. 4.—Exposed in a room in the Pathological Building. Fan running. Absolutely no preparation of the floor. Floor and walls very dirty.

In this series twelve plates were exposed, the total time of exposure being the same as in all the other series, 710 minutes.

They were exposed during an experimental operation on a dog, the operation being a secondary one through an infected wound.

Only three varieties were found. The most numerous could not be identified. They were large bacilli of irregular shape, nonmotile, and of luxuriant growth, evidently a contaminating organism which has often been found in the laboratory. It was not pathogenic for a guinea-pig. The two other forms were isolated. One proved to be M. candidus, while the other was a typical colon bacillus. This caused the death of a guinea-pig in less than twenty-four hours after intraperitoneal injection, the postmortem showing that the cause of death was an acute peritonitis. The organism was grown from the cultures made from the peritoneal cavity.

An interesting feature about this series of plates is the extremely large number of mold colonies, and, considering the dirty room, the small number of bacteria. It is possible that the molds may have killed off the other microorganisms.

The total number of colonies (exclusive of molds) was 141. The average number falling per minute of exposure was .2.

CONCLUSIONS.

1. *Floor.*—When other conditions were the same and a just comparison could be made (Series A to C, inclusive), it would appear that the presence of some antiseptic in the wash-water used upon the floor made a marked difference in the number of bacteria falling on the plates per minute (14.2 and 19.6 colonies per minute with no antiseptic, .65 to 4.08 per minute with some antiseptic on the floor).

2. *Fan.*—Whether the fan made any difference or not it would be hard to say. Comparison of Series A, No. 1. with Series A No. 2, would go to show that it did not, while comparison of Series B, No. 1 and B, No. 2 would tend to show that there was a perceptible difference.

3. *Walls.*—The condition of the walls would seem to make the greatest possible difference. This was discovered accidentally, for at first it had been overlooked. Ordinarily the head nurse in the operating-room takes great pains to have the port-

RESUME OF PROTOCOLS.

Series No.	Room where exposed	Date exposed	Fan running?	Preparation of floor	Additional remarks on condition of room	No. of plates exposed	Total No. of mins. exposure	Total No. of colonies	Colonies falling per min.
A–1	Gyn. O. R.	April, 08.	No	Bichloride		12	710	2,855	4.08
A–2	Gyn. O. R.	June, 08.	Yes	Bichloride		12	710	2,778	3.09
B–1	Gyn. O. R.	July, 08.	No	Carbolic		12	710	461	.65
B–2	Gyn. O. R.	July, 08.	Yes	Carbolic		12	710	1,707	2.04
C–1	Gyn. O. R.	Dec., 08.	No	No antiseptic on floor		12	710	13,916	19.6
C–2	Gyn. O. R.	Dec., 08.	No	No antiseptic on floor		20	710	10,105	14.2
D–1	Gyn. O. R.	Jan., 09.	Yes	Plain water on floor	Walls cleaned a few days before.	20	710	232	.32
D–2	Gyn. O. R.	Jan., 09.	Yes	No preparation of floor, not even water.	About 3 weeks after cleaning of walls.	20	710	14	.02
E–1	Pus Operating room	Feb., 09.	Yes	No preparation of floor, not even water.	About 2 weeks after cleaning of walls.	12	710	105	.15
E–2	Amphitheater	Feb., 09.	No	No preparation of floor	Walls not cleaned for months, but *no one in room.*	12	710	2	.002
E–3	Amphitheater	Feb., 09.	Yes	No preparation of floor	Walls not cleaned for months, but *no one in room.*	12	710	1	.001
E–4	During oper. on dog in Dr. Robb's room in Path. Bldg.	Feb., 09.	Yes	No preparation whatever	Walls and floor very dirty.	12	710	141	.2

RESUME OF PROTOCOLS.

Series No.	No. of Colonies on each plate.* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	No. of moulds	No. of pathog. varieties	Total No. of varieties	No. of varieties ident.	No. of varieties not ident.
A-1	(105) 76	(45) 46	(85) 166	(55) 12	(20) 4	(65) 25	(40) 138	(35) 18	(55) 1384	(45) 438	(120) 317	(40) 220									5	0	18	9	9
A-2	(105) 14	(45) 175	(85) 32	(55) 105	(20) 45	(65) 1531	(40) 332	(35) 106	(55) 274	(45) 38	(120) 68	(40) 38									23	0	13	8	5
B-1	(105) 65	(45) 14	(85) 53	(55) 45	(20) 23	(65) 48	(40) 39	(35) 21	(55) 25	(45) 51	(120) 28	(40) 19									18	0	12	7	5
B-2	(105) 79	(45) 68	(85) 134	(55) 162	(20) 69	(65) 504	(40) 147	(35) 148	(55) 95	(45) 140	(120) 107	(40) 63									16	0	15	11	4
C-1	(105) 1804	(45) 1169	(85) 1405	(55) 1167	(20) 1619	(65) 112	(40) 1040	(35) 1000	(55) 1263	(45) 839	(120) 1344	(40) 969	(20) 88	(20) 449	(45) 389	(45) 173	(45) 750	(45) 527	(45) 539	(50) 639	2	0	13	8	5
C-2	(30) 636	(30) 240	(30) 713	(20) 320	(20) 547	(20) 636	(25) 202	(44) 569	(44) 518	(44) 525	(44) 496	(44) 511									Not worked out on account of large No. colonies per plate.				
D-1	(30) 8	(30) 15	(30) 15	(20) 5	(20) 1	(20) 5	(25) 5	(44) 27	(44) 12	(44) 20	(44) 11	(44) 15	(20) 2	(20) 7	(45) 15	(45) 12	(45) 16	(25) 16	(45) 6	(50) 19	0	0	11	6	5
D-2	(30) 2	(30) 1	(30) 2	(20) 0	(20) 0	(20) 4	(25) 1	(44) 0	(44) 0	(44) 0	(44) 0	(44) 0	(20) 0	(20) 0	(45) 1	(45) 2	(45) 0	(45) 0	(45) 1	(50) 0	0	0	6	2	4
E-1	(105) 0	(45) 0	(85) 0	(55) 1	(35) 0	(50) 25	(40) 5	(35) 0	(55) 0	(45) 0	(120) 54	(40) 22									2	1?	6	4	2
E-2	(59 mins. each) 0	0	0	0	0	0	1	0	1	0	0	0									0	Not identified			
E-3	(59 mins. each) 1	0	0	0	0	0	0	0	0	0	0	0									1				
E-4	(60) 6	(60) 9	(60) 13	(60) 8	(60) 0	(60) 11	(60) 16	(60) 24	(60) 37	(60) 6	(60) 3	(50) 8									26	1	3	2	1

*First No. = No. mins. plate exposed.

able enameled furniture, the floor, and all other accessories in spotless condition, while the dust is allowed to gather on the walls for weeks. On examining Series D, No. 1. we were greatly surprised to find almost no colonies and this in spite of the fact that the floor had been mopped up with only ordinary water and that the fan was running. On investigation, it was found that the housekeeper had had the walls of the room thoroughly scrubbed a few days previously. Further experiments showed that this was a most important factor, for even with the floor absolutely uncared for, and with a fan running, practically no colonies were obtained after the walls had been cleaned (see Series E, No. 1).

4. *People in Room.*—But even with the dirty walls, and with no preparation of the floor, and with the fan running, practically no colonies fell on the plates when they were exposed in a room on Sunday, when no one was stirring around (see Series E, Nos. 1, 2, 3).[1]

5. The finding of B. pyocyaneus in a room in which a case infected with this organism had been operated upon three weeks previously is of interest (see Series E, No. 1).

6. The series exposed in the uncared for pathological laboratory should be noted. Here the molds prevailed and there were not many bacteria, but B. coli was found. This was the only organism in the entire group which was pathogenic for the laboratory animals.

7. In the summer season when the windows are more or less open the number of bacteria present seem to be more numerous than in the winter season or when the windows are closed.

From our experience from a bacteriological analysis of the air of the operating-room (prepared in the way that we have described) and from our practical experience now in a considerable number of abdominal and plastic operations both on dogs and human beings the electric fan can be kept running during an operation without causing any bacterial infection in the wound. Further experiments, however, from this standpoint will be necessary before positive deductions can be drawn. Thus far the work done seems only to emphasize what we knew before, namely, that an aseptic technic is the necessity of paramount importance.

I wish to express my obligations to Mr. Samuel M. Glenn and

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[1] This experiment would strongly support the idea that contamination of the wounds in the operating-room depends mainly upon faults in technic.

Mr. Harold O. Ruh, of the Bacteriological Laboratory of the Western Reserve University, and to Dr. Clyde Cummer, of the Medical Department of the Lakeside Hospital, for the detailed bacteriological work connected with this research.[1]

702 ROSE BUILDING.

A CONSIDERATION OF ECLAMPSIA WITH A REPORT OF A CASE ACCOMPANIED BY HEMIPLEGIA.

BY
CHANNING W. BARRETT, M. D.,
AND
JOHN H. HARGER, S. B., M. D.,
Chicago.

ECLAMPSIA is a condition manifested by convulsions about which much has been written and little is known. Recent observers are prone to look upon the eclamptic attack as only one of the many manifestations of a disease of the pregnant woman, which disease is accompanied by marked toxicity, but which may or may not exhibit the eclamptic attack. The theories as to its causation are as numerous as the manifestations of the disease itself, among which may be mentioned that of nervous origin first claimed by Maureceu; acute kidney changes with or without uremic manifestations; the presence of coagulation producing ferments originating from the placenta; embolism from placental cells; cerebral anemia or hyperemia or edema; increased abdominal pressure leading to pressure on the ureters or kidneys; fetal poisonings, placental poisonings or toxins; infections; disturbed thyroid metabolism and autointoxication with leucin, tyrosin, or acetone or some other toxic substance that is unknown. Zweifel has well said that it is a "disease of theories." Some of these theories are apparently well founded, but none of them will serve completely as a basis for rational therapeutics.

The pathological changes are also numerous, those in the kidney and the liver with the marked increase in the toxicity and tension of the blood are quite constant, the other lesions being of a secondary nature. The clinical manifestations of eclampsia are self-evident. A pregnant woman, especially in the latter months, with convulsions, is perhaps in 99 per cent. of the cases eclamptic. However epilepsy, hysteria and, more rarely, other forms of convulsions may be a source of error. Any departure from the normal, manifesting a toxicity, excitability, headache, vomiting, edema, urinary disturbances, mental disturbances, etc., should put the observer upon his guard for the recognition of the preeclamptic condition.

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[1] In working out varieties of organisms Chester's Determinative Bacteriology was followed.

We find in literature mention of the various theories of causation and occasionally an extensive discussion of some one or more etiological factors, but most authors dea largely with the various therapeutic measures. Most are entirely empirical, but a few stand out as being extensively used and giving the most promising results, these being the ones that lower blood pressure and eliminate toxins. However, several years ago Volhard(60) was unable to show the blood serum of eclamptics more toxic than in other conditions, and Volhard with Stewart(61) and Schumacher(62) showed that the results obtained by the injection of blood and urine of eclamptics into animals to be so variable and dependent upon so many factors that they must be received with the greatest caution. But in contradistinction to this nontoxic theory, the greater the increase in elimination, the more marked the improvement in most cases.

The following case is one of unusual interest because of the large number of convulsions, the extent and duration of the coma, the extensive and rare complications, and the rapid and complete recovery:

History of Patient.—Mrs. Y., age twenty-one, a German, I-para, was admitted to the hospital February 16, 1908, at 12 noon, in a comatose condition with a history of having been delivered about twenty hours previously and having had about seventy-five or more generalized convulsions. The convulsions having begun at the time or immediately after delivery and continuing up to about five hours before being admitted to the hospital. From the history obtained, the patient became unconscious (comatose) soon after the onset of the convulsions and owing to their frequency she did not regain consciousness during the intervals nor had she five hours later.

Examination.—General examination at the time of admission showed a young white woman, well nourished, lying quietly in coma, the eyes half-closed, slight nystagmus, corneal reflexes were absent, breathing was puffing and sonorous, and of the Cheyne-Stokes' type. The tongue protruded about two inches, was very much lacerated and swollen and was held firmly by a rigid lower jaw. The lips were cyanotic, temperature 103° per rectum, respirations 17, and pulse 152 and very irregular.

Regional.—Pupils were contracted and reaction to light was sluggish.

Chest.—Heart impulse was full and bounding and transmitted over entire anterior portion of the chest. The tones were loud but no murmurs were heard.

Lungs.—There was some harsh respiratory sounds heard posteriorly, but no areas of dullness or râles.

Abdomen.—The abdominal wall was flabby and the skin showed many linea albicanates. There was no rigidity and no tenderness, but considerable tympany.

The liver and spleen were not palpable.

The uterus was five fingers above the symphysis and was freely movable.

External Genitals.—The labia were darkly pigmented and very edematous. The perineum showed a recent laceration of second degree. There was considerable serosanguinous vaginal discharge.

Skin.—The skin was very dry and dirty, and there was a slight congestion and edema about both ankles.

Subsequent History.—December 16, 1908. As soon as the patient was admitted to the ward she was given digitalin gr. one-fiftieth, and one-half hour later camphorated oil ♏ xxv, both hypodermically. Venesection was then attempted, but only four ounces of very dark blood were obtained. This was followed by subcutaneous transfusion with normal salt, 1,000 c.c. The patient was then catheterized and 20 ounces of dark red, cloudy urine were obtained, the examination of which showed sp. gr. 1018, slightly acid, albumin in large quantity, sugar negative, numerous hyaline casts, and granular casts in still larger numbers, and many red and white blood-corpuscles.

At 1:40 P. M. the patient was given magnesium sulphate, glycerine āā 1 oz., turpentine 2 dr., and normal salt 8 oz. as a high enema at 110° F., with fair results. At 3:30 P. M. her pulse was still 144, and irregular, and the patient was given nitroglycerine gr. 1/100 hypodermically. This was repeated every two hours, alternating with aromatic spirits of ammonia ♏xv, by the same method, after which the pulse gradually became slower, more regular and of a better quality.

Hot packs were then instituted to be repeated every four hours alternating with colonic flushing of normal salt one quart. The patient's pulse and her respiration were not disturbed by the packs, and at first there was little or no perspiration, but after the third or fourth pack, perspiration was profuse each time. These were continued for four days, and were then given twice a day for three or four days. At no time did they seem to depress the patient or aggravate her symptoms.

The enemas or flushings were partly retained and that portion expelled always flushed out more or less bowel content. After two days these were changed to enemas of normal salt, 5 to 6 ounces every four hours, and these being well retained were continued for about one week.

The subcutaneous transfusion of normal salt was repeated at from six- to eight-hour intervals until 4,000 c.c. had been given.

About twelve hours after the first transfusion, the patient had a copious involuntary urination which was repeated in about an hour and a half and every two to four hours afterward for several days.

Examination of the patient ten hours after admission showed respiration more regular and deep, pupils less contracted and reaction to light more marked. Corneal reflex present. Pulse 124, more regular and of good quality.

At 10 A. M., February 17, 1908, patient resisted examination and moved about considerably, moving the right leg, however, but slightly. Breathing was regular and much like that of normal sleep when she was undisturbed. Pulse 108, of good quality. The uterus reaching to the height of the umbilicus, was boggy and apparently tender.

At noon, the patient could be induced to swallow a little liquid and was given croton oil ♏i in olive oil ʒj. This was repeated in about nine hours and which, with the colonic flushings of hot normal salt solution, resulted in good bowel movements. At 9 P. M. the last subcutaneous transfusion of normal salt (1,000 c.c.) was given. This the patient resisted very strenuously, with arms and left leg. The right leg still being moved only slightly. She would cry out, but would not respond to questions or stimulations. She was also restless most of the night, and would cry out at times.

On the morning of the 18th, examination showed the patient's condition much improved. She seemed to understand what was said to her and to watch the movements of the doctors and nurses, but was unable to speak and could only make muttering sounds. There was then a paresis of the right side of the face, total paralysis with loss of reflexes of the right arm. The patellar reflex was absent ,but the plantar was fairly active, and the patient flexed the legs and thigh feebly, but was apparently unable to extend them. Babinski's and Oppenheim's signs were negative. Sensation of the legs was not disturbed, but was apparently lessened or lost over the right arm. The pulse at that time remained about 100 during the packs and when at rest and was regular and of good quality. The temperature varied from 100° to 101° F. per rectum, while the respiration was normal. At 10 A. M., of the 19th, the patient could speak some words so as to be understood, but mumbled most words. Said she had no pain and felt fine. The right leg then moved quite readily and the arm could be raised, but only slightly. The paralysis continued to improve very rapidly, and by the 21st the right leg could be handled almost as well as normal and the right arm could be moved and held in any position, but had almost no power.

The motor speech difficulty improved very slowly, and the patient was soon found to have a sensory aphasia. When asked her name, she gave the correct answer, but gave the same answer to many question of an entirely different nature.

The patient continued to improve in every respect and was seen by a nerve specialist on the 28th, when examination showed the following:

Right arm and hand were much weaker than the left; but no apparent difference in the strength of the legs. Reflexes normal; sensation normal; eyes negative. She repeated simple sentences correctly, but long, complicated sentences she did not comprehend and did not speak the words plainly.

The A. M. urine on the 29th showed the following:

Sp. gr. 1013, albumin one-fourth per cent. Sugar test negative. Casts, a few hyaline and granular and many pus-cells, which were evidently from the lochia. The albumin and casts gradually lessened until they were absent when the patient was discharged.

Mondy(50) reports a case of eclampsia at the sixth month in which there was no albumin in the urine, but the convulsions persisted for three days, when the patient was delivered, after which the convulsions still persisted and she finally developed a left hemiplegia. The convulsions were then limited to the face and left arm, and the patient died the ninth day.

Cronin(52) reports a case, a patient twenty-six, V-para, full term, no convulsions observed, but the patient was found in coma which gradually disappeared. She was delivered by accouchment forcé. On the eighth day she developed complete paralysis of the left side, which was nearly recovered from when she was discharged in five weeks.

Partridge(45) reports a case with constant convulsions for twelve hours after delivery, followed by paralysis of the left arm. Recovery was complete.

Welch (46) reports a fatal case of eclampsia in which postmortem examination showed a large clot in the left corpus striatum, with fluid blood in all of the ventricles, and multiple subcutaneous hemorrhages.

Engelman(49) reports a case with 200 convulsions and recovery. The patient had about forty during and soon after labor, they then ceased for four and one-half days and then returned with renewed violence--155 in twenty-eight hours. Each time the treatment was by venesection of 500 c.c. followed by intravenous and subcutaneous transfusion and rectal salines in large quantities frequently repeated.

Jardine(51) reports a similar case with over 200 convulsions, with about the same treatment and recovery.

The consensus of opinion is that eclampsia is due to the retention of toxins in the body, of whatever source or nature they may be. Whether it is caused by an undue retention of toxins normally present in the blood of a pregnant woman or an overproduction of toxins normally produced or a production of toxins not produced in a normal pregnant woman seems not to have been determined.

That the ability of the kidneys and other emunctories to eliminate toxins at this time is below normal is quite evident. But whether the kidney changes are primary and lead to an undue retention of toxins or whether there is an overproduction of toxins at this time, leading to secondary changes in the kidneys, and in turn causing an undue retention, is also undecided.

Duhrssen reports 196 cases in which the urine showed the following: Albuminuria 96 per cent.; abundant albumin in 92 per cent.; casts, etc., in 60 per cent. Olshausen found albumin in 97 per cent., and Leopold in 90.7 per cent., and yet the urine in some eclamptics is practically free from albumin casts, etc., still the toxic manifestations are just as severe as those with the most severe form of acute nephritis. Mohr(53) and Freund just recently claim that they have succeeded in isolating a specific toxin from the placenta, and they thus have obtained an important support for the theory which ascribes eclampsia to intoxication from the placenta. This specific toxin is the same as that which Talquist isolated from the body of the tapeworm and from the intestinal mucosa—merely oleic acid or sodium oleate. This normally occurring, apparently innocent substance is apparently able to acquire toxic properties under certain conditions, especially an hemolytic property. They think that this demonstration of an hemolysin of a definite chemical constitution in the placenta throws much light on the normal and pathologic conditions of pregnancy. The oleate from the tapeworm causes pernicious anemia when injected into animals. It is possible that even under normal conditions the maternal red blood-corpuscles are naturally destroyed by this hemolysin to supply the fetus with iron. Boos(59) believes that in certain cases of eclampsia the condition is due to a specific nonproteid toxic substance, while in others that they are due to anemia, and in some instances to epilepsy.

We are still in the dark as to the exact toxic nature of this condition and are thus without any antitoxin or other specific means of combating the disease, but practically every means of elimination known to medicine, past and present, has been and is being used more or less and with considerable success. The same is true of the use of drugs to control convulsions.

In the treatment of eclampsia there should be two main objects in view, the first and most important one being to preserve the patient, and the second to eliminate the toxins and, if possible, the source thereof.

It is thought by a great many observers that the essential thing is to control the convulsions, in view of the fact that they cause a rapid increase in the kidney and liver changes, often leading to cerebral or meningeal hemorrhage, and may lead to exhaustion. But the majority are now practically ignoring the convulsions themselves and turning all their attention to the rapid emptying of the uterus and elimination of the toxins.

To control the convulsions the well-known sedatives, such as morphia, chloral, bromids, hyoscin and the anesthetics, have been extensively used. However, they are now being used by most men as a temporary measure until delivery can be accomplished, when in 75 per cent. of the cases the convulsions cease without sedatives. The convulsions also cease in many cases after the blood pressure is lowered and elimination is well established.

The following is a summary of the different forms of treatment, with results obtained by competent observers.

Morphia has been and is being used by some, but the tendency is now to use as little as possible, because it interferes with elimination, and will not in many cases control the convulsions. Nicholson(7) advises morphia as a primary injection until the effects of thyroid extract can be secured. Smith(8) uses it as an initial sedative until conditions can be controlled by veratrum viride. Newell(9) uses morphia with hyoscine. Allen(12) uses it to relax the muscles. Bacon(14) thinks morphia is the best to control the convulsions. Reed(15) and Lobensteine(18) use morphia with chloroform. Kirkey(10) and Bumm(29) advise against morphia, and the latter thinks that all narcotics are contraindicated, and especially late in coma and convulsions, and claims that they weaken the heart and slow respiration and aggravate the condition. He says, if morphia must be given, it is better to give it early and by rectum. Partridge(2) advises the use of chloral and bromides per rectum for the convulsions. Reed(15) uses chloral in large doses with chloroform or morphia and chloroform. Lobenstein(18) used chloral with other narcotics. Moran(32) thinks chloral hydrate a very valuable remedy in eclampsia and that it should be given in large doses per rectum, and better given in milk as a watery solution tends to produce tenesmus. Smith(8) and Bumm(29) condemn its use, and Newell(9) thinks it is of no value because of its slow absorption. Reed(15), Lobenstein(18), Davis(30), and many others advise the use of chloroform to control the convulsions, but Smith, Newell, Bumm and others do not use either chloroform or ether. Bacon(14) thinks that anesthetics should be used for operative purposes only. Moran(32) says that he formerly believed chloroform to be the sovereign remedy in eclampsia, but experience has markedly changed his view, as he found that it increased the tendency to asphyxiation during a convulsion, was a cardiac depressant and, as the organ together with the liver and kidneys have already undergone degeneration, its administration should be restricted to the time of operative intervention. Smith(8) gives an initial dose of morphia and follows it in five minutes by the tincture veratrum viride, ♏x, hypodermically, and repeats every ten minutes until convulsions cease or pulse comes down to forty. Reed(15) uses veratrum viride with chloroform, and Davis(30) gives it, if pulse tension is high, but Kirkley, Allen, and Bacon advise against its use, and Moran(32) thinks that, in view of the fact that it depresses the heart, its dangers more than offset its advantages.

Thyroid extract and parathyroidin have in the last five years been used and advocated in the treatment of eclampsia and some striking results have been reported from their use. White and Wilcox, and Cushney claim that thyroid extract reduces blood pressure, increases the amount of urine, and at the same time gives a marked increase in the tissue waste, and therefore a considerable increase in the urea and other waste products in the blood and urine. Cushney says that in many individuals there is no apparent effect unless very large doses are given and that the general action varies greatly in different cases. Those who have used thyroid extract in the treatment of eclampsia have done so because of its action in reducing blood pressure and increasing the urinary secretion, but apparently they have given no thought to the marked increase in urea, etc., from the increase in tissue waste. This increase in metabolic processes, producing a large amount of urea and other waste products in the blood when the kidneys are already doing less work than normal would, theoretically at least, increase the toxemia; however, the results obtained may be due to the fact that urea itself is a diuretic, and, when it is increased in the blood, a diuretic action is produced. Strumer(6) reports forty-one cases of eclampsia treated with thyroid extract, gr. x at once and gr. v q. four hours, and claims that the urine is increased after two or three doses and shows a marked increase in twenty-four hours, whereas with saline injections and morphia, given alone, no marked improvement sets in for twenty-four hours. He used in addition morphia and saline injections and early delivery with a mortality of 12.2 per cent. Nicholson(7) advises a primary injection of morphia followed by thyroid extract gr. xxx or xl, with gr. xx in six or eight hours if there is no improvement. His object being to produce thyroid intoxication as early as possible, the thyroid extract being a vasodilator, and thus aiding the kidneys and skin. He reports a case successfully treated in this way. Vassale(16) used a strong extract of thyroid or parathyroidin in three cases and thought his results were remarkable and advises the same treatment for tetanus and epilepsy. Lobensteine(18) reports six cases treated with thyroid extract with good results. He advises a dosage of gr. xxx per rectum and repeated in six hours and then gr. x t.i.d., and reduce the dose gradually. He claims that the pulse is slowed and made more soft and that diaphoresis and diuresis are increased within a few hours.

The good results thus reported may favor the theory that eclampsia is due to a disturbance of metabolism from a lack of thyroid secretion.

Nitroglycerin is used by some instead of the veratrum viride, as it seems to be less depressing to the heart and yet has a strong vasodilator action, thus decreasing the blood pressure without affecting directly the heart muscle. Moran(32) claims that it aids in diuresis and diaphoresis more than veratrum. McCarthy(21) lays great stress on the use of nitroglycerin and reports good results.

In view of the fact that some claim there is an increased intracranial tension in eclampsia, and postmortems show very often a marked congestion and edema of the meninges, some have used and advocated lumbar puncture. Max Henkel(13) did lumbar puncture in sixteen cases with a mortality of 25 per cent. and concludes that the quantity of cerebrospinal fluid is in a very slight degree a causative factor in eclampsia. Bumm(29) and Moran(32) think it is a useless procedure. Jardine(51) used spinal anesthesia with cocaine after lumbar puncture and thinks there was a beneficial effect after eight hours. Audebert(42) and Fournier think it should be used along with other means.

The interference with respiration during the convulsions, and thus poor aeration of the blood, has led a number of men to use oxygen. Newell(9) says it is far better to give it during convulsions than to give chloroform. Davis(32) advises continuous inhalation of oxygen during convulsions and after delivery and uses as little anesthesia as possible to control the convulsions. Bacon(14) thinks oxygen should be considered of vital importance during and between convulsions.

Elimination has been and is a universal means of treating eclampsia. The different methods have been variously employed, but the principal aim is to obtain as rapid and efficient elimination as is compatible with the condition of the patient. Diuretic drugs are not used in eclampsia except in so far as the drugs used to lower blood pressure have some diuretic action, but those acting directly on the kidney tissue to increase diuresis are to be avoided because they irritate and stimulate the already overstimulated and injured kidney tissue.

Diaphoresis is best obtained by the use of local or general hot packs, the diaphoretic drugs are to be avoided because of their depressing effect and slight or feeble action upon the sweat-glands in this condition.

Purgatives are quite generally used, and the more powerful ones are usually employed. Calomel in large doses followed by the salines or more often croton oil ♏ j or ij in olive oil or placed upon the back of the tongue. And these are often aided by colonic flushings, best with normal salt at 110° F., about two quarts.

As a means of diluting the toxins in the blood and eliminating the same, venesection and normal salt, intravenously, subcutaneous, or per rectum, have been used more than any other form of treatment, and the results obtained have been generally good. Nearly always some benefit has been noticed from venesection, and the same is true of the use of normal salt solution, except where there is a tendency to or an already developed pulmonary edema, in which the normal salt solution is contraindicated, but venesection will then be found of benefit. As a rule, venesection of 500 to 700 c.c. will give almost immediate improvement, and when followed by normal salt, diuresis and diaphoresis are soon increased and often to a marked degree. Five hundred to 1,000 c.c. of normal salt subcutaneously every six to eight hours (when there is no edema of the lungs or tendency thereto) is usually followed by marked improvement; or it may be given intravenously following the venesection.

Such men as Partridge, Jardine(4), Bumm(5), Strumer(6), Hagapoff(11), Osterloh(3), Liepmann(34), Roger de La Harpe(33), and others advise and use with good results both venesection and saline infusions. Osterloh has used this method of treatment, injecting 3,500 c.c. of normal salt in twenty-four hours. He says venesection is contraindicated when the patient is anemic with a small, rapid pulse, but has a wide field where there is a full hard pulse, more or less cyanosis, and incipient pulmonary edema. Liepmann advises saline infusions and in all plethoric cases venesection. Davis uses normal salt solution after venesection and also uses it as a colonic flushing and for gastric lavage. Harrar(19) reports 150 cases of eclampsia with a mortality of 36 per cent., but states that for a short period when hot packs, croton oil, and intravenous infusions of normal salt were used indiscriminately in all cases of eclampsia the mortality went up to 61 per cent., which showed that in cases where the heart is feeble and there is marked general weakness and tendency to pulmonary edema that saline infusions were to be avoided. Bacon(14) thinks that in view of the more recent theories of retention of chlorides in nephritis that normal salt solution should be used with caution in eclampsia. Peabody(58) gives his results and quotes from others showing that there is a marked decrease in the edema with salt-free diet in chronic parenchymatous nephritis, and cites instances to show that edema could be increased or decreased at will by the varying of the salt in the food. He makes no mention of the changes in acute nephritis. Gluzinski(54) describes several kidney affections which were distinguished by the retention of sodium chloride, the urine being entirely free from it, while a peculiar uremic syndrome was observed. He thinks that retention of sodium chloride is the first sign of acute parenchymatous nephritis. But Zangemeister(55) has been examining the chloride metabolism in pregnant women, and states that there is no ground for assuming pathologic retention of chlorides in the nephritis of pregnancy and eclampsia. He says that deprivation of salt as a therapeutic measure has, therefore, no logical basis. It may cause the edema to disappear, but only at the expense of the kidneys; they are liable to become irritated from lack of sodium chloride in the body fluids to hold other less soluble salts in solution. It is more logical, he says, to give more salts in nephritis of pregnancy and eclampsia. He states that an hypertonic salt solution has a diuretic action, but this, too, is at the expense of the kidneys, and that several writers have reported the development of albuminuria under deprivation of salt and also under the influence of an infusion of an hypertonic salt solution. He thinks that the trouble in the latter case is not that the sodium chloride acts as a toxin, but that the disturbance is in the osmotic process which it induces.

Against the use of normal salt solutions in eclampsia and similar conditions there is the theory that there seems to be an inverse ratio between the excretion of chlorides and the development of edema. But it seems quite possible that the edema in eclampsia is of a different nature than that of nephritics, for clinical observations in eclamptics does not show that an increase of sodium chloride in the blood causes an increase in the edema, but, on the other band, there is usually a decrease.

In more recent years, as the theory of fetal and placental origin of eclamptic toxins has gained ground, the treatment of immediate delivery has been shown to give good results in the hands of most observers. In 75 per cent. of the cases of eclampsia in which the convulsions begin anti- or intrapartum, they disappear entirely after delivery, showing that in these cases the source of the toxins has been removed, or the delivery has so lowered the maternal blood pressure and altered the patient's metabolism that her system is now able to combat and eliminate the toxins present or those being produced. However, in a few cases the convulsions do not develop until after the delivery—anywhere from a few hours to four or five days—or if they began before or during delivery they persist regardless of treatment. If in these cases the condition is due to toxins of a different nature or from a different source has not as yet been demonstrated. Liepmann(22), Bumm(29), Osterloh(31), Partridge(38), Johnstone(44), and many others advise immediate delivery and give statistics to show that the mortality has been lowered. Liepmann(22, 34) gives statistics from the gynecologic clinics at Würzburg, Basle, Halle, and Berlin that show an average mortality of 25 to 30 per cent. under expectant treatment, while with immediate delivery the mortality has dropped to 2.8 per cent., or even 1.8 per cent. in a series of 79 cases from April, 1904, to December, 1905.

Davis(30) advises a careful examination of the patient when she is first seen, and, if effacement is present, the cervix soft and two-thirds dilated or completely, the head well engaged and the uterus active, deliver at once, otherwise wait and use prompt and vigorous means of elimination until conditions are favorable. Roger de La Harpe advises against immediate delivery and reports seventy-one cases with a mortality of 16.9 per cent.

The methods of delivery vary somewhat with the conditions of the cervix and uterus and the ability and judgment of the accoucher. If the cervix is effaced and os dilated or easily dilated, forceps are applied or version and extraction is done. Bumm(29) says that instrumental dilatation is liable to cause injury and the balloon takes too long, and that better results are obtained by slitting the anterior wall of the cervix. The fetus can then be extracted. The whole procedure being done in about ten minutes. However, he thinks that only an expert should attempt this and that good results are expected only when delivery is rapid. Partridge(38) says that manual dilatation of an undilated cervix is the best and safest method. Fry(39) advises vaginal section and believes it to be the best and safest in eclampsia, but thinks that manual dilatation might be used in multipara, not, however, in primipara. Schockaert(43) advises manual dilatation in multipara and Bossi's dilator in primipara, and objects to Cesarean section and cervical incisions.

The treatment of some of the more severe and obstinate cases of nephritis in the last few years by decapsulation of the kidneys has led a few to try it in the severe forms of eclampsia. Pieri(40) says that in eclampsia the kidney lesions are very variable, that there may be epithelial lesions of varying severity, which remain superficial for a time, and, if they do become marked, may permit a return to normal. There may be congested lesions and these are responsible for anuria in most cases of eclampsia, and for such conditions surgical treatment is most valuable. The method of action of the surgical treatment is triple; it reduces congestion, eliminates the changed epithelium that obstructs the tubules, and by modifications in the vasomotor condition of the organ it favors the arrest of the nephritic process and the return of the normal urinary condition. Experience shows that at present four out of six cases of nephritis of this kind have been cured by operation. And it is especially indicated in the renal forms of eclampsia after failure of medical treatment has become evident. Particularly when the urine is in very small amounts, the amount of urea and extractives eliminated is very small and casts abundant. He says that operation must be done before anuria comes on, if it is to be successful in producing a cure. After anuria has set in the intoxication becomes so deep that operation avails little. Edebohls, G. M., (56) reported his first case, June 6, 1903, in the *New York Med. Jour.*, which was in the eight month of pregnancy and accouchement force failed to stop the convulsions, after decapsulation the recovery was prompt. His second report, June 2, 1904, in *Boston Med. Jour.* Patient was a primipara, twenty years old, sudden attack of eclampsia during last month of pregnancy accompanied by blindness and deep coma. The kidneys were decapsulated after the second convulsion. Two days later asphyxiated twins were delivered, one of which did not come to life. No attacks after operation. Third case, primipara, twenty years old, always healthy, urine normal one month before delivery. Normal delivery, July 8, 1905. Eleven hours later complained of headache and trouble with vision. Nearly complete blindness and convulsions followed quickly, and four hours later the patient was in deep coma. Urine contained 1.5 gr. albumin and 2.5 urea. Both kidneys were decapsulated. Two convulsions in the first eight hours after the operation, which were the last ones. Consciousness returned twenty-four hours after operation, and recovery was rapid. May, 1906, patient was in eighth month of new normal pregnancy and urine normal.

Gauss thinks that in view of the fact that in 25 per cent. of eclamptics the convulsions continue after delivery and all medical measures have been tried, the operation of decapsulation of the kidneys is justifiable, as it offers the only relief in these cases and that we are justified in using any methods that are not so dangerous in themselves as to increase the mortality. He reports two cases in the service of König at Freiberg in which great aid was rendered by operation, the convulsions were severe and continued several hours after delivery. After operation only two convulsions occurred in one case, the unconsciousness was lessened, the pulse and temperature fell, the amount of urine increased, and the specific gravity became normal. He advises the operation only when all ordinary means fail, then decapsulate to give the patient a chance for her life, which must otherwise be sacrificed to uremia. Weiner(26) reports a case of eclampsia coming on seventeen hours after delivery, in which the convulsions became more and more severe and did not yield to symptomatic treatment. After decapsulation of both kidneys, the convulsions stopped at once and consciousness returned after a coma of five hours. The findings in one kidney were those of an acute nephritis. Asch(25) reports a case of severe eclampsia with recovery after decapsulation of both kidneys. Poland(37) reports one case in which the convulsions came on postpartum and persisted in spite of ordinary means. After decapsulation of both kidneys there was a marked increase in the amount of urine and the specific gravity, while there was much less albumin; but, as the patient began to come out of the coma, she died of edema of the lungs nineteen hours after operation. Sippel(36) thinks decapsulation advisable in the more severe forms, as no harm will be done to the patient, and death is certain if the condition is not relieved. He believes that operation should be confined to the very serious and hospital cases in which coma and convulsions continue without relief from ordinary means. Franck's (23) case was one of rebellious eclampsia in which he performed decapsulation of the kidneys, and the eclampsia subsided, but the patient died of an intercurrent pneumonia. He compares his results with nine others, which show that decapsulation was followed by rapid recovery in six cases, in two no benefit was manifest and in two others improvement was not marked. He says that if, in these cases, the mortality of 30 per cent. be ascribed to the operation, it is such a lowering of the average death rate in severe eclampsia, when coma and convulsions continue after delivery and other means of treatment have failed, that immediate decapsulation should be advised.

Pinard(57) reports the case of Chambrelant et Pousson, a primipara, twenty-one years old, eclampsia a few hours after beginning of labor. Half an hour after delivery patient had three severe convulsions followed by deep coma and almost complete anuria. Decapsulation of both kidneys. In twenty-four hours urine excreted normally. Coma disappeared on the third day followed by complete recovery.

Falgowski(28) reports a case of postpartum eclampsia where the condition became more and more severe until the heart began to fail and some signs of edema of the lungs developed. Urine contained blood and great quantities of albumin. Thirty-four hours after delivery both kidneys were decapsulated. No convulsions after operation. Six and one-half hours after the operation the urine was free from blood and the breathing more easy. Recovery was complete. He thinks that eclampsia is more severe the earlier it occurs during pregnancy or the later in the puerperium. He advises to operate quickly in these cases, especially with disturbances of the respiratory organs.

Asch(25) reports a case similar to the one of Falgowski. I-para, age twenty-one, spontaneous and easy delivery. First three days of puerperium were without fever or other disturbances. On the third day the patient was suddenly seized with an epileptiform convulsion, which recurred at short intervals until the patient became comatose. The face became edematous, the urine contained much albumin. Decapsulation of both kidneys was easily performed. No convulsions after the operation. Complete recovery in sixteen days. He advises to operate quickly in cases occurring during puerperium, but in antepartum cases to wait for the effect of quick delivery.

A study of eclampsia with its many theories of causation, its varied clinical and pathological manifestations, leads to the following conclusions as representing the growing consensus of opinion:

1. That the preeclamptic condition is not a distinct clinical entity.

2. That eclampsia is only one of the clinical manifestations of the toxemia of pregnancy.

3. That there may be a severe grade of toxemia of pregancy without eclampsia.

4. That there may be a severe form of nephritis with pregnancy and no manifestations of eclampsia.

5. That on the other hand we have severe forms of eclampsia with no apparent changes in the kidney.

6. That the toxemia of eclampsia with or without kidney changes is of a different nature from that of uremia.

7. That it seems quite probable that eclampsia is not always due to the same kind of toxins and that the toxins producing eclampsia are from different sources.

8. That the patient's nervous condition and the personal equation are causative factors in the onset and the severity of the eclamptic attack.

9. That there are no pathological changes characteristic of eclampsia.

10. That the present mortality of eclampsia can be considerably lowered by the proper use of the methods at our command.

11. That in every case manifesting symptoms of toxemia of pregnancy prompt treatment should be instituted not only to relieve the toxemia, but as a prophylactic to eclampsia.

12. That prompt emptying of the uterus is the most efficient means we have of relieving the eclamptic condition.

13. That the various sedatives should be used with care and

only in most cases as a temporary means until the patient can be relieved by delivery and elimination.

14. That venesection and the use of normal salt solution are valuable aids in the treatment of eclampsia.

15. That decapsulation of the kidneys offers considerable chance for recovery in the most obstinate cases which do not yield to delivery and other measures, but should not be attempted until after other means have failed.

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UNCONTROLLABLE HEMORRHAGE FROM THE NONPUERPERAL UTERUS.

BY

G. H. MALLETT, M. D.,

New York.

NOT long ago, a case of persistent menorrhagia and metrorrhagia that the writer was called upon to treat presented some features that caused him to look up some literature on the subject. The frequency with which intractable uterine hemorrhage was mentioned as an indication for hysterectomy was a source of surprise, and the impression received by the reader was that surgical enterprise had reversed the order of his early teaching, for whereas hemorrhage was considered not as a disease in itself but as a symptom, and that the cause was to be discovered before the symptom could hope to be relieved. In these cases the uterus was first removed and the cause was looked for afterward. Of course I refer to those cases of profuse or persistent hemorrhage of obscure origin and especially those occurring near the menopause. Before the surgical era in gynecology the opportunity to study the cause of hemorrhage or of uterine diseases in their incipiency was lacking for want of material; because the postmortem specimens were not satisfactory, but at present there would seem to be uteri enough removed to satisfy the requirements of the pathologists and to give the rest of us hope that some discovery of value would soon be forthcoming. At present the pathological findings in the uteri or these cases of obscure hemorrhage are as various as the interpretations put upon them by the pathologists.

The history of the case that sent me in search of the unknown is briefly as follows: The patient was forty-seven years old. Her menstruation began at fifteen and was regular and of the twenty-eight-day type and of six to seven days' duration. The flow was profuse and usually accompanied by clots. She suffered pain on the first day, but rarely had to go to bed. She usually had some leukorrhea, but never enough to necessitate wearing a guard. She usually had some backache after unusual exertion but was able to exercise as much as most women, and otherwise her general health was excellent. She was married for the first time in June, 1907, and immediately sailed for Europe. In June she had menstruated seven days (normally for her), in July she flowed ten days. In August at Brighton, England, she was taken with a profuse hemorrhage which, notwithstanding rest in bed and medical treatment, lasted for five weeks. She and her family were so alarmed that they thought only to get her home alive. She was still flowing when she was carried on the steamer at Southampton. The moment the voyage began, however, the flow ceased and she began immediately to regain her strength, and by the time the steamer landed, although pale, and thin she was able to walk about unaided. Two days after she landed, in the latter part of September, she began to flow again, and I saw her in consultation with her family physician. Upon examination her cervix was found to be eroded, the uterus somewhat enlarged and retroverted but movable. The appendages were normal. On October 15 she was curetted, and the endometrium was found somewhat thickened. The uterus was suspended to the abdominal wall. Recovery was uninterrupted.

Menstruation came on regularly, and was less than had been her custom. She enjoyed good health until the following June, when she began to flow profusely, in July more so, and in August nearly the whole month, notwithstanding the free use of ergotin, hydrastin, stypticin, strychnine, with confinement to bed, elevation of feet and hot douches. She was then curetted again. The uterus was found to be in good position. A large amount of thickened endometrium was removed in strips. The pathological report showed: "A very high degree of hyperplasia of the endometrium, but not histological features of malignancy. The condition is commonly designated as adenomatous hyperplasia of the endometrium." After this she remained well, with normal periods, until the February following, when she had another profuse and prolonged flow. Medicinal and therapeutical treatment was begun actively during the flow and during the interval. She had remained in bed during her menstrual periods and had taken every care of herself. The uterus and vagina were packed with iodoform gauze. Iodine intrauterine irrigation was tried and iodine and carbolic was applied to the endometrium, but of no avail. The flow became continuous in March, and then in April I removed the uterus per vaginam. The ovaries and tubes appeared perfectly healthy and, consequently, were not removed. Her recovery was rapid and uninterrupted.

The pathologists report states that "the uterus is of normal size and that the walls are 3/4 of an inch in thickness. The consistency of the uterus is normal. The cavity is two inches long and is lined in small areas with a thin mucosa. Microscopic examination shows the tops of the uterine glands are missing. The gland bases are scanty and the stroma is much increased, with some round-celled infiltration. The uterine wall beneath the mucosa contains an increased amount of connective tissue. The muscle walls are normal. Some of the vessel walls are very slightly thickened. The peritoneal coat is normal. The diagnosis is hyperplastic endometritis."

At the time of operation this patient weighed less than 110 pounds, and showed extreme pallor. At present she has regained her normal weight of 150 pounds and looks the picture of health.

In looking over this case, one finds a woman in excellent general health, who had no circulatory disturbances due to a lesion or functional trouble of heart, renal lesion, or obstructions in the portal system, nor systemic disease, as diabetes, chronic alcoholism, or morphinism, hemophilia, or syphilis, nor was she hysterical, nor an unusually nervous or apprehensive woman. Masturbation or excesses in venery or obstinate constipation were positively denied. The bleeding was so profuse that a hysterectomy was performed to check the hemorrhage, and yet two eminent pathologists, independent of each other, find nothing abnormal in the uterus or curettings, except "hyperplastic endometritis." The humble seeker after truth then naturally turns to endometritis for the cause; and this is what he finds in one of the last works on Gynecological Pathology (Roberts): "Nothing, perhaps, is more difficult to define than 'endometritis'—so much is included under the term. Some authors limit the meaning to mere inflammatory conditions, others to overgrowths of the endometrium, others to atrophy of the endometrium, others to inflammations not only of the endometrium, but of the whole uterus. Nothing is more puzzling; even the normal conditions of the endometrium are more or less unknown; the endometrium is difficult to see and we know little of its changes either between or during the menstrual periods; still less do we know of the changes we term *pathological.*"

Probably as good a classification as any is that of Herman, who, under the heading "Endometritis," mentions three conditions:

I. The inflammations of the endometrium.

II. Conditions associated with overgrowth of the endometrium.

III. Conditions associated with its atrophy.

The second condition: those associated with overgrowth of the endometrium, is the pathological finding in the case mentioned. Under that heading is the following: "This condition is not endometritis, as such, at all; inflammation is probably not a factor in its causation; it is a condition of hyperplasia, hypertrophy, and overgrowth of the endometrium, a new formation, and the name "adenomatous disease of the body of the uterus" is a more correct term.

Two distinct types appear to exist: (a) Polypoid. The endometritis polyposa, fungous, or villous endometritis of other authors. (b) Diffuse or hyperplastic. In this there are no localized outgrowths from the endometrium. The whole mucosa is uniformly thickened and extremely vascular. Examples of this are best seen in uteri containing fibroids and from this enormously hypertrophied endometrium comes the severe hemorrhages and sometimes water discharges. In an article by Miller, in a recent text-book, he says of hyperplasia of the endometrium: "This condition which is usually considered as endometritis, may be the end-result of an infection of the uterine mucosa, but is oftener due to the influence of myomata, ovarian tumors, malpositions of the uterus, perhaps at times to nervous influences, and to certain general diseases." Macdonald, in an able paper, states: "There appears to be little doubt that a large number of the cases variously described as 'hyperplastic endometritis,' 'hypertrophic glandular endometritis,' 'interstitial endometritis,' etc., are simply, as Van Meerdervoort describes them, secondary results of long-continued congestion of the mucosa. The different forms are merely of degree, and he suggests 'chronic edema' as a more correct title for the whole class. Löfquist arrives at very similar conclusions." We have positive knowledge that the menstrual organ is the endometrium, but from what has been said, it is evident that in this case, the condition of the endometrium is not the cause of the hemorrhage, but the result of a condition elsewhere.

As long ago as 1879 Dr. Emmet described the uterus as an *erectile organ*, surrounded by a mass of blood-vessels, pressing in every direction through the loose connective tissue of the pelvis, and directly affected by any increase or diminution in the neighboring circulation. Continuing, he says: "We must appreciate the fact that in few other parts of the body have we such a network of vessels within the same extent of space. In consequence of the erectile character of the uterine tissues, these vessels in time become varicose or overdistended from continued obstruction to the circulation, and have an almost incredible venous capacity. As a stream will saturate the ground and lose itself in a marsh, so will the circulation through the pelvic cellular tissue, and, in diseased conditions, become equally sluggish. In attempting after death, to inject the vessels in the pelvis of a female, who has long suffered from uterine disease, it will be found that the distinctive form of the veins is frequently lost at different points; and with all care, the injection will become extravasated and diffused." These veins really become sinuses. The recent histological investigations of Keiffer have furnished ample proof of the correctness of Emmet's views on this subject. It is the belief of the writer that the most important factor in the causation of the hemorrhages of this patient, is the venous congestion. The explanation of the bleeding in these cases is given by Macdonald as follows: "The menstrual stimulus, normally resulting in a comparative rapid overdistention of the capillaries, produces its effect more slowly through the thickened mucosa with its already comparatively distended and more numerous capillaries, but when hemorrhage does occur, at the very height of the congestion, it is more profuse than normal because of the more widely distended condition of the capillaries. Similarly, the bleeding will last longer, partly from the lowered tone of the vessels from prolonged dilatation, and partly from inefficiency of the edematous muscle, together resulting in less efficient response to the vasomotor stimulation, and so failure to arrest the hemorrhage with normal rapidity."

Again, Macdonald points out that not all cases of venous congestion become clinically apparent as menorrhagia. The abnormal hemorrhage depends, to some extent, upon the resulting power of the capillaries. When the congestion arises from an increased arterial supply, there is a tendency to metrorrhagia in addition to the menorrhagia. Any sudden stimulation, mechanical or otherwise, determining a sudden further increase in the red blood supply, may cause hemorrhage."

The explanation of this case, as far as any can be given, I think, is as follows: This patient in early life suffered from venous congestion of her pelvic organs. The derangement of the circulation was probably caused by loss of balance between the waste and repair, faulty nutrition or by indiscretion in exercise during menstruation. The uterus became saturated with blood and unable to relieve itself, even by prolonged menstruation, sank to a lower plane in the pelvis. The overdistended veins after a time lost their contractility, and were unable to return to the circulation the amount of blood received from the capillaries. This made the weight greater and the uterus descended toward the vaginal outlet. Its center of gravity was changed and it became retroverted. In this position, the circulation was still more interfered with. There was no inflammation and no adhesions, and the condition could easily have been corrected early in life, but the patient had never had a pelvic examination. The congestion and malposition caused the delayed menopause. The marriage relations at forty-seven years of age caused the sudden stimulation, mechanical or otherwise, which determined a sudden farther increase in the blood supply and the hemorrhage was the result. It is true that the malposition of the uterus was corrected after the hemorrhage became severe, but not until the veins had lost their contractility, and the uterine muscle its tone and resiliency, and that the circulation was not improved, was shown by the edematous or hyperplastic condition of the endometrim.

This is a type of one class of intractable hemorrhage. This class, due to circulatory disturbance, is a large one, but fortunately seldom of such severity as the one just related.

One may judge of the difficulty of determining the causes of uterine hemorrhages, when no less an authority than Freund states that: "Only in cases of bleeding from carcinoma has an anatomical basis for the hemorrhage been demonstrated."

In the microscopical examinations of the uteri extirpated for hemorrhage, the findings have been various and the construction put upon them equally so. When the changes in the endometrium were found to be slight, attention was then turned to the uterine walls, and upon these findings have the various theories to explain the menorrhagia been based. Nearly all have shown thickened blood-vessels, and the inability of these rigid canals to respond to vasomotor stimulation has been considered in a causative relation. This is the oldest theory, and was advanced by the French writers, Pichevin and Petit and Couveillier, and later by the Germans, Reineke and others, and by Barbour and Palmar, Findley, and other Americans. This is called the uterine arteriosclerosis theory, and while the thickened walls may be an important factor in the causation of hemorrhage, many writers do not believe this to be the sole cause, and many others disregard this entirely, believing the condition to be a normal retrograde process or part of a general arteriosclerosis.

Cases are shown where a marked sclerotic condition of the vessels has been unattended by hemorrhage, and profuse hemorrhages have occurred with no changes in the vessels. Theilhaber, Anspach and Shaw consider these vessel changes essentially different from those found in general arteriosclerosis, and, according to Shaw, sclerosed vessels can be found in uteri with perfectly normal menstruation. Pankow, as quoted by Ehrenfest, states that such sclerosis is an almost characteristic feature of multipara uteri.

Pozzi found an increase in the elastic tissue in and around the vessel walls in greater proportion than fibrous tissue, and contended that this offered resistance and paralyzed its contractile power, while Anspach considers the elastic tissue physiological in the multiparous uterus, and believes the condition of the musculature that he calls "metrorrhagia myopathica" may be due to a deficiency in the normal increase of elastic tissue.

Theilhaber believes that the changes in the vessels described as arteriosclerosis are normal in parous uteri, and points out in chronic metritic and senile uteri the relative increase in fibrous and decrease in muscular tissue, and considers the relative insufficiency of the latter the cause of the hemorrhage.

To an ordinary observer it would seem that if the tissues and their proportions in a normal uterus could be determined, progress could be made in the study of this subject. At present, having no standard, it seems to be a difficult matter to decide what is a normal uterus during the different periods and conditions of a woman's life. That all of these bleedings are dependent upon ovarian stimulation is shown by the fact that none occurred after the menopause.

The best classification of the causes of uterine hemorrhage is that given by Macdonald, and is as follows:

"1. Abnormalities in the periodic ovarian stimulation.

"2. Conditions giving rise to muscular insufficiency, either from
- "(a) Actual deficiency of muscular tissue or
- "(b) Loss of tone, and consequent deficient reponse to vasomotor stimulation.

"3. Conditions giving rise primarily to continued congestion of the endometrium, either from
- "(a) Increased arterial supply or
- "(b) Venous obstruction."

And to this I would add those functional disturbances of the uterus brought about by impulses transmitted to the genital organs from a normal or diseased central nervous system, as described by Ehrenfest.

In looking for a cause of a hemorrhage, when no lesion is apparent, the influence of the menopause must not be lost sight of. A hemorrhage occurring at this time is probably due to a circulatory disturbance that may be of long duration.

Time and space will not permit of a further discussion of the causes of uterine hemorrhage, and in our lack of knowledge of its etiology, little can be said of its treatment.

The diagnosis in these cases is made by exclusion.

The importance of a most careful history, both on the part of the patient and her family, and a thorough physical examination can be readily appreciated. In addition to the pelvic examination, dilatation and curettage offers the most valuable means of diagnosis, and in many cases relieves the symptom. If one wishes to still further explore the cavity of the uterus, this can satisfactorily be done by separating and lifting the bladder from the anterior wall and dividing the uterus in the median line from the cervical cavity up to the extent desired. By this means, the uterine cavity is exposed, and small polyps or thickenings that may have escaped the curette are readily detected. A few stitches will repair the traumatism, and no harm will be done. The uterus may also be explored by an incision when the abdominal cavity is opened and it is desired to avoid a hysterectomy. The most important point in the diagnosis is to eliminate the possibility of a malignant process.

The treatment of girls and young women suffering from menorrhagia and metrorrhagia should be along physiological lines by rest before or during the menstrual periods, avoidance of active or fatiguing exercise at all times. Careful regulation of the bowels, and tonics, judiciously given, especially strychnine, are beneficial. Iron is best avoided, and ergot is of no value as it increases the blood pressure. An effort to equalize the circulation by means of hot baths is sometimes successful. Applications to the cervix of tincture of iodine and tampons in the vagina between periods have helped some cases, but I have never seen any benefit derived from intrauterine applications.

In cases of severe hemorrhage, the patient should be put to bed with feet elevated, a very hot and prolonged douche given, adrenalin given hypodermically and stypticin by mouth. The vagina may be tightly packed and the packing changed in twenty-four hours. In extreme cases subcutaneous infusion and bandaging of the limbs may be required.

In regard to the surgical treatment of these cases, when the endometrium is thickened, curettage gives varying periods of relief, and in some cases is an aid to a cure, but as this does not remove the cause, permanent results cannot be expected. When the patient is young and it is important to preserve the uterus, Dr. Jarman, of this society, recommends the tying of the uterine arteries. He has had satisfactory results in several cases of this kind. A year ago I saw him practise this simple procedure upon a girl of seventeen. This patient had been seen by some prominent gynecologists, and they had advised that hysterectomy be performed. Dr. Jarman informs me that she now menstruates regularly and normally. Her bleedings were in all probability caused by venous congestion.

In this class of cases of uterine hemorrhage that have resisted palliative means, the alternative lies between the destruction of the endometrium by means of the cautery or atmocausis or a hysterectomy. Because of the uncertainty and danger of the former, the operation of choice should be the hysterectomy. A glance through the medical literature will convince the reader that these forms of uterine hemorrhage are on the increase, and that the uteri are being extirpated with equal frequency and the indications for hysterectomy are ever widening, while the treatment of the uterine condition is narrowing down to that operation alone with fewer palliative means. It requires no prophetic eye to see in these signs the indications of the approach of another operative wave such as passed over the civilized world some years ago, when countless ovaries were sacrificed, but this time surgical enterprise will be directed toward the uterus. How, then, can we treat these intractable cases? Presuming that malignancy has been excluded, then palliative and hygienic methods may be faithfully tried. and medical treatment instituted; the life regulated; rest insisted upon for the weary and worn; classified exercise for the indolent or flabby muscles; possibly local treatment or a curettement. Some of these cases will end up with a hysterectomy, but many will get well without one. By far the most important work the medical profession can do for these cases is in the direction of their prevention. It is noticeable that in these cases of hemorrhage from obscure causes the unmarried women give histories of prolonged and profuse menstruation dating from girlhood and in married women from childbirth or a miscarriage. These appear to me to be the result of venous congestion, and in some of the cases that are attracting attention abroad at the present time and whose principal symptom is hemorrhage, and are called "chronic metritis," I recognize our old acquaintance, "subinvolution." The prevention of these conditions lies in the care of the girl during her early menstrual life and the proper attention to the uterus after childbirth or miscarriage. The girl should not be worked mentally during her early years of menstruation. Her strength should not be diverted from her developing organs to her brain and nerve tissue; but rest and the simple life should be enforced. In England the girls are required to remain in the recumbent position three days of menstruation, until that function is well established; and their women are considered stronger than ours. Every case of prolonged menstruation should be treated systematically, and efforts made to discover and remove the cause. After childbirth or miscarriage the case should be followed up and treated until the uterus has properly involuted, and also in these patients prolonged or profuse menstruation should receive proper attention. The so-called "strenuous" and nerve racking life of the present day is responsible for many of the ills of women and it is not surprising that there should be exaggerated or diminished ovarian stimulation.

The hope of the future of our women lies in the education and the enforcement of the hygienic and quiet life.

244 WEST 73D ST.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of May 11, 1909.

The Second Vice-President, Joseph Brettauer, M. D., *in the Chair.*

Dr. S. M. Brickner presented a specimen showing a

FREE PERITONEAL BAND ENCIRCLING AN OVARIAN CYST.

The patient in whom this peculiar condition was found was B. L., aged twenty-five, admitted to the first gynecological service of Mt. Sinai Hospital on April 22, 1909. Her past history was unimportant. For the past three months she had complained of severe dragging pain in the left lower quadrant of the abdomen, radiating to the back. The pain was not constant, but was made worse by working or stooping. She had never been pregnant, although she had been married for four years. Her menstrual history was of no significance.

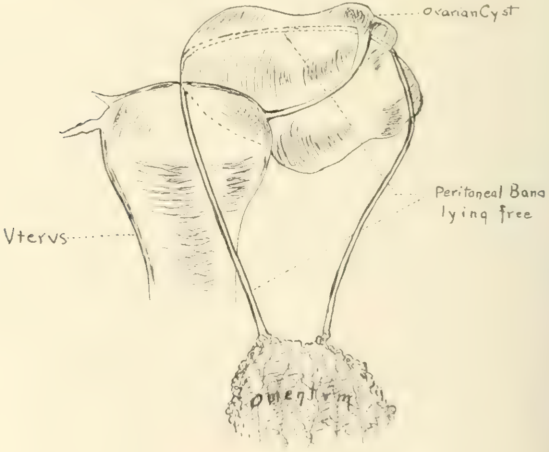

Fig. 1.

Examination revealed a small vagina with no vaginal discharge. The uterus was retroverted and lay in the median line. A freely movable, cystic mass lay in front o the uterus on the right side. It was of the size of an orange.

At the operation on April 26, the vaginal findings were confirmed. A multilocular cyst as large as an orange was found in front of, and to the right of the uterus. It sprang from the right ovary. The left appendages were normal. The right tube passed upward and outward behind the cyst and the fimbriæ were spread out at the upper pole of the cyst.

Completely encircling the cyst lay a white structure which looked like a silk ligature and which passed backward over the cyst and was attached to two folds of omentum by either extremity. This omentum overlay the cecum and was not adherent. The cord was entirely free and was laid aside while the cyst was ablated. The cord itself was then removed. The patient has made an uneventful recovery.

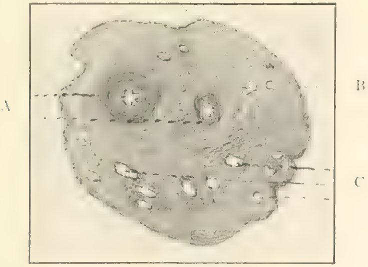

FIG. 2.—Microscopic section of peritoneal band. A, Arteries B, Peritoneal coat. C, Veins.

I can find no record in the literature of a similar condition, although it must have occurred before. Aside from the fact of its encircling the ovarian cyst, its only interest lies in its derivation. Although there was no evidence at the operation of any previous inflammatory process, it seems most likely to me that the band represents a former omental adhesion which by the growth of the cyst became thinned out. But this does not explain the absolute looseness or freedom from adhesion in which the cord lay in the abdomen.

The cyst was an ordinary multilocular cyst, all the compartments but one of which were filled with serum, the exception containing colloid material. The microscopic examination of the cord, kindly made by Dr. Frank, showed that the band was a strand covered with peritoneum, and containing connective tissue in which were imbedded two arteries and several veins.

Dr. Studdiford reported a case of

CESAREAN SECTION NECESSITATED BY CICATRIX AFTER AMPUTATION OF CERVIX

I would like to report an interesting case that occurred in Bellevue on last Thursday night. The patient had been operated upon in Dr. Coe's service about two years ago. She had been admitted with a history of several attacks simulating appendicitis and with a relaxed pelvic floor and a very bad laceration of the cervix. The appendix was removed and amputation of the cervix was done. Last January she was readmitted to the ward suffering from a good deal of pain in the abdomen, and at that time about six months pregnant. On examination by vagina there was no cervix to be palpated and the external os was hardly more than a dimpling of the vaginal vault. She was in the hospital for three or four weeks, and then left and returned to the emergency service about a week or ten days ago. On Thursday night she went into labor. There was no dilatation of the cervical canal, although the pains were severe. Dr. James, who was in attendance, attempted under anesthesia to dilate the cervix with a steel dilator, and then by introducing his finger; the introduction of the finger into the cervical opening was followed by most profuse hemorrhage, so much so that he was obliged to desist and put on clamps. Five or six hours after this first attempt, she was still having strong pains but no dilatation. After examination it was decided that the best chance for delivery was by Cesarean section. After the uterus was opened and the child delivered the cervical canal was found to admit a finger and was surrounded by a firm cicatricial band about 1/4 inch in thickness which required some force to dilate. The child weighed nearly eleven pounds. Cesarean section was undoubtedly a wise decision because if an attempt had been made to drag the head through the cicatricial tissue there would have been very bad laceration. It was the first case in my experience where an amputation of the cervix has caused obstruction to labor. I have delivered a number of cases where I have amputated the cervix and it has occasioned no trouble, but in this case it was an absolute obstruction apparently.

The amputation of the cervix was done by the house surgeon, and I rather imagine that the incision in the amputation was made too high up, so that the vaginal mucous membrane was drawn over and narrowed, instead of making his incision rather lower down on the cervix and pushing the mucous membrane of the cervix up. He probably had amputated too high and I suppose there must have been some branch of the uterine arteries or veins that was injured, but the hemorrhage was very severe, so much so that the woman showed the effect of it, and the cicatricial tissue was so firm that an attempt to deliver the child either by version or forceps would have undoubtedly caused severe injuries.

DISCUSSION.

DR. BRODHEAD.—I recall one case of protracted labor following amputation of the cervix. The patient was admitted at the Post-Graduate at full term, but by means of the hydrostatic bags we were able to dilate and deliver without laceration.

I can remember another patient who came to me several years ago at the seventh month of pregnancy, where the cervix had been amputated and the internal os was very tightly closed. The patient left the city at the eighth month, and the next information I had of her was that she had had a very short labor of two or three hours' duration with a dead child, and that she had died four hours later of postpartum hemorrhage. No doubt the uterus ruptured, and death was caused by shock and hemorrhage.

DR. MABBOTT.—I would like to ask Dr. Brodhead where he thinks would be the probable location of the laceration of the uterus—whether through the cicatrical tissue or through the uterus in continuity higher up?

DR. BRODHEAD.—I did not deliver the woman and I do not know, but I think that the tear started in the cicatrix and extended upward.

DR. MALLETT —I would like to ask the members of the Society if it is their experience that mpregnation does not occur so frequently after amputation of the cervix as before. It seems to me that it does quite as frequently.

DR. VINEBERG —I would say that I know quite a number of cases in which pregnancy has occurred after I have done an amputation of the cervix. I do not know of any particular difficulty. I know of one case in which there was a little difficulty in dilatation, but the patient finally delivered herself all right. One result is that the first pregnancy ends very often in miscarriage in about four months. I think trachelorrhaphy rather difficult to do in the right way so as to leave a straight canal. It seems to me there is more likelihood of the conception taking place after amputation of the cervix done in the ordinary manner, whereas I have seen a number of trachelorrhaphies done by very good men in which it would be pretty hard for some of these to conceive.

ACUTE SUPPRESSION OF URINE FOLLOWING A CRIMINAL ABORTION.

I wish to relate a case in which a woman committed abortion upon herself, a young woman, thirty-one or thirty-two years of age. She had two children, and was pregnant, I suppose, about seven or eight weeks, when she passed a catheter into her uterus, and the doctor who was called a couple of days later said he had found the woman almost cyanosed with a temperature of 105°, and in very bad condition. He curetted her at once with assistance, and for the first two days the temperature persisted with a pretty rapid pulse. Then he stated she became acutely jaundiced, then the temperature fell to the normal and the jaundice disappeared in about forty-eight hours. Then she had suppression of the urine. I saw her on the sixth day of the suppression of the urine. She had no temperature then; a slow pulse, rather tense; vomiting was almost incessant, her general condition fairly good. I saw her in the forenoon. That night she was transferred to Mount Sinai, and then put on treatment for the purpose of stimulating the action of the kidneys; hot packs, hot-air baths, subcutaneous infusions,and various other remedies, practically without avail. The temperature remained normal. She passed about two ounces of urine in the twenty-four hours. The urine obtained contained a large amount of albumin and some casts. The woman's condition became now markedly worse. She was rather stuporous through the second night in the hospital. In the morning she was dull, apathetic, rather hard to get her to answer questions. Her pulse was slow and tense, and an *x*-ray picture taken showed apparently two large stones in the kidneys, I must say that I did not lay very much stress on the finding, and I looked upon the case as one of acute suppression from acute nephritis. I asked one of the attending surgeons, Dr. Howard Lilienthal, to see this patient, and he agreed with the diagnosis, and thought that the only hope lay in cutting down upon the kidneys and doing a nephrotomy. I did so that same morning. The left kidney was of enormous size, about three times the ordinary size, bluish-red in color. There was no dilatation of the pelvis and no stone, simply a highly congested kidney. I did a nephrotomy on that side. I asked the anesthetist about the condition of the patient. He said it was good. She was rather a stout woman and the operation had taken only about twenty-five minutes up to that time. So I turned her over on the other side and exposed the right kidney without much difficulty, and then the patient began to breathe very rapidly and rather superficially. We began at once to do artificial respiration, but she did not come to. This kidney also was about in the same condition, but not to such a marked degree as the one on the opposite side. There was nothing in the pelvis, it was simply a case of acute congestion.

In looking over Israel's work on the kidney, he reports one case similar to this occurring after abortion of three months where acute suppression had set in. That patient died, but it was found, however, that she practically bled to death because after delivering one of the kidneys the operator had torn the pelvic vein. I do not know of any other case.

A very interesting point in my mind was the absence of fever in this case. The renal capsule was very loosely adherent, but the cellular tissue was very markedly edematous. The day of the operation was probably the eighth day of the suppression of the urine.

DISCUSSION.

DR CURRIER.—I was recalling, as Dr. Vineberg was narrating his case, a case I operated on some years ago in which there first appeared a small tumor in the anterior wall of the vagina. I supposed it was a vaginal cyst and operated upon it. I tried to dissect it out. Finally noticing that there seemed to be rather a long pedicle to it, I cut off the pedicle and found that I had the ureter. The tumor was on the left side of the vagina and the ureter had crossed to the other side. I could see the left ureter in the wound and attached to the bladder, while the right ureter had taken an anomalous course as described. The woman had had a great deal of pain in the right kidney and other indications pointing to nephritis However, after the operation and after some considerable febrile reaction, she recovered. Then I was uncertain as to just what the situation was, thinking that this might be a supernumerary branch of the right ureter, I allowed the patient to go home. In the course of a few weeks she returned and I then operated upon her again. First, however, I had used the Harris segregator and determined that the supposed right ureter was not attached to the bladder. A small portion of the urine, a few drops, I obtained from the right kidney through the fistulous opening which had remained in the vagina, showing that if there was an attachment to the bladder it must have been a very small one. Subsequently operating on her by abdominal section, I introduced a ureteral catheter through this fistula into the right ureter; first, however, having placed a ligature under it after the catheter had been passed. The ureteral catheter was easily passed to the pelvis of the kidney, a distance of ten inches, then unfortunately the catheter slipped out and I was unable to touch the end of the ureter again. I tied the ligature, however, and I presume I should have left it open and allowed it to drain. My intention had been to transplant this ureter into the bladder, but after an ineffectual search treated it as stated. The following day the woman developed great fever. The temperature went up to 106° and about fifteen ounces of urine were passed from the bladder. The following day there was about the same quantity of urine with an additional quantity passed through the vagina, so that the ligature evidently did not occlude this passage entirely. The woman became a little better, but the following day she became comatose with a very high fever, got better the following day, and the day following died suddenly. An autopsy was made, but I regret to say the notes were mislaid and I cannot tell what the condition of the kidneys was. It is apparent, however, that there was an anomalous entrance of the ureter into the vagina instead of the bladder, with a coincident nephritis, probably of long duration.

DR. GRAD.—Recently in a case we had at the hospital my chief did a supravaginal hysterectomy for fibroids on a woman fifty-seven years old. The operation took about thirty-five minutes in all and she left the table in very good condition. We were very much surprised when we found that she had almost total suppression of the urine for thirty-six hours after that short operation. The urine examination was normal before operation, and there was nothing about the case to arouse suspicion that anything would go wrong. After thirty-six hours she began to secrete some urine, and in three or four days afterward everything became normal. We were never able to explain satisfactorily just what was the cause of the suppression. She made a very nice recovery.

DR. WELLS.—A young girl was using a hairpin for the purpose of masturbation. It slipped into the bladder and was lost. She let the pin stay there as long as she could possibly stand it, and finally came into the clinic in a very septic condition. She was taken into the hospital and a median vaginal incision made. The hairpin was found encrusted with phosphates. The operation was simple and the incision left open for drainage. She never passed a drop of urine afterward and died within a short time. No autopsy was allowed.

DR. VINEBERG.—Referring to cases in which the ureters had been tied off. In the cases in which a single kidney had been removed in error, the patients lived for about eleven days. In these cases there is no edema of the extremities or external parts. It is a peculiar feature that there are not really very many symptoms until pretty nearly the last. Then symptoms develop. Vomiting and increasing coma. There are no uremic convulsions.

An interesting feature, so far as the original septic condition was concerned, was that all symptoms referable to the pelvic organs had disappeared, the uterus was normal in size, and there was no exudation. The cases of scanty urine after operation usually have a temperature of 102° or 103° in most cases, and in the urine we find a good deal of albumin, but this condition, as a rule, is only temporary and passes off in two or three days.

DR. GEORGE MALLETT read a paper on

UNCONTROLLABLE HEMORRHAGE FROM THE NONPUERPERAL UTERUS.*

DISCUSSION.

DR. BROOKS H. WELLS.—I have listened to Dr. Mallett's paper with a good deal of interest. We all have these cases come to us occasionally and they give us much trouble. I do not know of any gynecological ailment that requires such a careful investigation as this particular condition. The discussion to-night rules out the grosser conditions that produce hemorrhage, such as carcinoma, sarcoma, angioma, fibroids, adenofibromata, tubal inflammation, subinvolution, polyp, and cases where there is a diseased endometrium or some foreign material inside the uterus. This reduces the subject to cases where to ordinary means of diagnosis the uterus is apparently normal, and yet where we may have practically uncontrollable hemorrhage.

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*For original article, see page 480.

Clinically we have two classes of these cases. One is in young girls shortly after the beginning of menstruation, and in these personally I have found that very large doses of a reliable fluid extract of hydrastis, a dram four times a day, usually gives relief, and when it does not, I have had some very surprising results from the use of iodide of potash.

In older women, when no gross lesion could be found either before or after operation, I have on more occasions than I like to mention been obliged to remove the uterus, but I have learned that in these cases it is wise always to give the iodide a fair trial.

Some years ago I was called to the country to see a woman about thirty-five, the mother of four children, who, aside from menorrhagia, had apparently been healthy. Three of her children have perfect health, one has a slight cerebellar ataxia. She had for years flowed profusely and had been curetted with no result by myself and by other members of this Society. On this occasion she had been flowing for five weeks, and when I saw her she was reduced so that merely turning her over in bed caused a profound faint. Th uteru and other pelvic organs were apparently perfectly normal. I curetted the uterus so as to be certain it was empty; nothing was found. The endometrium was thin and the pathological report showed only a very slight subacute endometritis. She was packed with absolutely no result. Finally the bleeding was temporarily controlled by packing the uterus with strips of gauze soaked in iodine. Hydrastis, styptol, stypticin, strychnia, ergot, calcium salts and gelatin had been used with no results. I learned there was a suspicion that her husband had had syphilis, and she was immediately put on iodide of potash in doses of 5 to 15 grains three times daily. Within a short time the bleeding ceased. She was kept on the iodide for several months, and now has perfectly normal menstruation, which she has not had before for years, and only flows about three days. She is given a course of iodide about twice a year or when the flow begins to be too free. That case is typical of quite a number.

Iodide of potash or similar salts are useful not on'y where there is a suspicion of specific infection, but in many cases of menorrhagia where no definite cause for the bleeding can be found.

Dr. Goffe —I am glad to know of the success of Dr. Wells in the use of iodide of potash in these cases. I have not tried it myself, but I shall certainly bear it in mind. In women that are at the menopause or in prolonged menopause, I do not hesitate in cases that do not yield to ordinary treatment, such as rest in bed, curettage, tamponing, etc., to resort to vaginal hysterectomy. It certainly is efficient in relieving the hemorrhage, and I find the patients improve very markedly, as Dr. Mallett has described in the case he reported in detail. That has been my experience. It is not only a justifiable operation, but I think it is demanded in many of these cases.

Dr. Stone.—Unfortunately I did not hear the details of the history of Dr. Mallett's case, but it seems to me that he has covered the literature of the subject very completely. Of course, as he pointed out, the theory that these hemorrhages are due to sclerosis of the uterine vessels in one that was quickly taken up by many who were anxious to find a real cause for these very troublesome cases, but it has recently been overthrown as an explanation for at least all cases. I think the arterial changes of the uterus are not those which are judged to be characteristic of general arteriosclerosis in the aged.

The theory which Dr. Mallett also mentioned, *i.e.*, the one of muscular insufficiency, is one that it seems to me is attractive and perhaps one which further study will show us is the correct explanation. Theilhaber has written in particular in favor of to this theory, and he has also made it account for, at least, a part of these hemorrhages which occur at the beginning of menstrual life.

In regard to the treatment of these cases, there is one method which I have recently used on two occasions as a sort of emergency measure. It was first suggested because of its success in pulmonary hemorrhage. You all know that the men in Saranac have been using for some time the inhalation of amyl nitrite. I have used it in two cases recently of severe uterine hemorrhage, in one case using three pearls at six-hour intervals, in the other, two. In both cases there was an immediate cessation of the hemorrhage. I followed it up with hydrastis and ergot. The effect was quite striking, and it seems to me worth while to mention to-night. I recommend it to you as an emergency measure.

Dr. Pinkham.—I want to thank Dr. Mallett for the very scholarly way in which he has presented this subject.

I have had, in the last two years, two such cases, where there were no demonstrable pathological lesions to account for the symptom.

The theory of Theilhaber is very plausible, and of those advocated perhaps the most reasonable.

There are three factors which control uterine bleeding: the central nervous system, the sympathetic system, and the condition of tonicity of the uterine muscle. A certain number of cases can perhaps be explained by the theory of nervous control, but I believe that in the majority of cases the uterine muscle is to blame, that the atonic condition of the muscle bundles reduces the vascular support, more especially the venous, bringing about a chronic passive congestion of greater or less extent.

With that idea in view, I treated both of my cases with the aim to strengthen and build up the uterine musculature. My method was by hypodermic injection into the uterine muscle, of strychnine, quinine, and aseptic ergot. I used this method on the first case about six weeks until she went abroad. After two months' absence, she returned and I followed up the treatment for two months more—at the same time giving her general tonics. She was perfectly cured. She was thirty-eight and a nullipara.

The second case is a multipara about fifty years of age. She has had three children and two miscarriages—the last pregnancy was a miscarriage. Frequent curettings showed absolutely nothing in the endometrium. I used the hypodermic injection of quinine and strychnine. The last time I saw her, she had no bleeding for four weeks

I know of a case treated, as Dr. Wells describes, with iodide of potash, with a very excellent outcome. I often use bichloride of mercury in tonics, sometimes with marked results.

Dr. Vineberg.—How do you inject that into the uterus—into the cervix?

Dr. Pinkham.—Yes, into the cervical muscles as high as I can.

Dr. Vineberg.—What is the dose?

Dr. Pinkham.—One two hundred and fiftieth grain of strychnine and a quarter of a grain of quinine.

Dr. Mabbott.—It is simply a question of adding one more idea to the discussion which has been very satisfactory to me, and with none of which do I differ. Dr. Mallett in his paper recognizes the probable truth of Emmett's belief, which he says has been further vouched for, that the uterus is an erectile organ. Now, if the uterus is an erectile organ like other erectile organs, it is probably subject to periods of persistent erection, similar to priapism. Erection is usually produced by some muscular contraction which interferes with venous return and keeps the blood dammed back in certain veins or sinuses, and if we assume that to occur in a certain uterus and then if we assume that menstruation occurs normally, you will observe in such a case (Dr. Mallett's case was so reported), that when the hemorrhage is once stopped, it stays stopped apparently until a further menstrual period. Now, we know that in menstruation the lining layer of the cells of the uterus desquamates. We have a denudation, and hence the pathological report that that was the only condition found persistently, as I remember.

Another analogy is that of ulcer of the leg, for instance, which we find almost impossible to cure as long as the venous circulation is impeded, even by the dependent position, and therefore we find that renewal and healing is promoted by elevation of the affected leg. Incidentally, I assume that in his treatment, both in relating the case and in his recommendations in summing up, Dr. Mallett would not recommend elevation of the lower extremities of his patient, except where the hemorrhage had itself become more or less dangerous, because of course an increased gravitation of the blood to the middle portion of the body would be undesirable; and in obstetrical hemorrhages, we certainly elevate the pelvis and lower both head and limbs, rather than otherwise, until the patient is in danger of syncope.

It seems to me, then, that we possibly could explain some cases as a condition of chronic erection or priapism affecting the uterus, the venous congestion promoting hemorrhage and at the same time retarding physiological repair of the denuded endometrium. And it seems to me that for that reason, such a sedative as the iodide of potash would very clearly be indicated in the treatment of this class of cases, and of course without any experience with bromide of potash, I should think the bromide would be similarly useful in some such cases.

Dr. Brodhead.—I would like to ask Dr. Mallett what experience he has had in the use of stypticin; how much, if any, reliance can be placed in its use; and if it is to be used, what the dose is to be and how it is to be given?

Dr. Grad.—About two years ago I had a patient who had an uncontrollable uterine hemorrhage where the causative factor could not be discovered. The patient was thirty-two years old and she had been curetted six different times within two years. She was curetted the first three times by a general surgeon and three different times by three different gynecologists. The operation was undoubtedly done very thoroughly.

This time she had been flowing for several months and she came to the hospital for a hysterectomy, which was done. The pathologist reported that he could find nothing abnormal in the uterus.

At that time I looked up the literature and I gave the subject some thought and it occurred to me that perhaps the explanation of these cases is somewhat different than what we have been in the habit of considering. Perhaps it might be that menstruation itself depends on some internal secretion, very much similar to what is being considered at the present time regarding lactation. It is believed that mammary activity is the result from some chemical substance secreted. May it not be that in these cases the ovarian structures secrete abnormally the chemical substance which gives rise to the metrorrhagia?

Dr. Brettauer.— Dr. Stone's mention of amyl nitrite as a styptic reminds me of some experiences I had twenty years ago with cocaine when this drug was first used in minor surgery. Its action was not definitely known and it was used in much stronger solution than at present. The result was that very frequently we experienced the toxic effect and were obliged to use amyl nitrite as an antidote. Small operations under cocaine anesthesia were always accompanied by increased parenchymatous hemorrhage, which frequently necessitated compression and delay before it was checked. I distinctly remember instances where this bleeding stopped instantaneously after the inhalation of amyl nitrite fumes. It never occurred to us to attribute the cessation of the bleeding to the amyl nitrite, but rather to the condition of syncope caused by cocaine poisoning.

Dr. Mallett.—I want to thank the gentlemen for their generous discussion. I would not have it understood that I am prejudiced against hysterectomies in these cases—of course in suitable cases. What I object to is the beginning of the treatment with the hysterectomy, as I have seen reported. I think the hysterectomy in suitable cases, such as those approaching the menopause, is the ideal procedure after other things have been tried. I think that an excellent way to do that would be by the abdominal route and leave the cervix in place and draw the broad ligaments across and unite them above the stump of the cervix, and the only sympton in that case would be the amenorrhea, and even in a young women, when it has to be done, they would have practically no symptoms but sterility and amenorrhea.

This particular patient took 4-grain doses of stypticin for a number of weeks. She thought it did her some good, but it failed in the end.

I have another patient now. She declines any operative procedure, so I cannot tell what is in her uterus. She takes 2 grains three times a day, but stays in bed, and so I cannot tell what it does. I personally have little faith in it.

This theory of Dr. Grad's has been considered, and it is now thought that menstruation is due to stimulation caused by the secretion of the ovaries in the blood; increasing the blood pressure adds to the stimulation from the sympathetic system and the nerve centers of the muscle itself.

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY.

Meeting of May 28, 1909.

The President, HENRY F. LEWIS, M. D., *in the Chair.*

FECAL CHOLESTERIN STONE.

DR. THOMAS J. WATKINS.—I have here a calculus which measures about an inch and a half by three-quarters of an inch which was passed from the intestine. It is composed entirely of cholesterin crystals. Here are some that have been dissolved in chloroform. The history of the case is very interesting.

The patient was a woman, sixty-five years of age, who had enjoyed perfect health except for the last six months, when she had had slight disturbances of digestion. On the morning of the sixteenth of May she was taken with a very acute abdominal pain, and dating from that time she had complete intestinal obstruction. There was little vomiting on the sixteenth, more on the seventeenth, and still more on the eighteenth. On the eighteenth the vomitus had a suspicion of fecal odor. There was a slight rise in temperature; pain was extremely acute. On the afternoon of the eighteenth I opened the abdomen, which was not very much distended, and found about six inches of the small intestine to the left of the umbilicus acutely inflamed, covered with lymph, and the loops of the intestine were matted together. These intestinal loops were separated, and then I found a suppurative mesenteric gland underneath the small bowel, which had ruptured. This gland contained about sixty minims of pus. The abscess was evacuated, the adhesions separated, drainage inserted, the patient put to bed, and had two or three bowel movements during the next forty-eight hours. Following that she had some obstructive symptoms. The small intestine perforated; she got a fecal fistula from the abdominal incision. She had some pain, not a great amount, and yesterday morning she passed this calculus. It would seem that this calculus could not have come from the gall-bladder; if it had, it must have come when it was small and increased in size in the intestinal canal. This woman was not ill enough to have passed the calculus from the gall-bladder before the time of the onset of the acute intestinal symptoms. In fact, she was in good health. The pus from this infected mesenteric gland showed streptococci, and there were possibly some pneumococci. The culture showed streptococci. The patient is improving more rapidly since the stone was passed. The stone probably produced an ulcer in the small bowel near the site of the suppurating mesenteric gland, which was the cause of the infection in the gland. It is rather peculiar that ulceration should have occurred so far from the ileo-cecal valve, which was at least 10 or 12 inches distant.

DISCUSSION.

DR. J. CLARENCE WEBSTER.—I had a similar case of intestinal obstruction a few years ago in the Presbyterian Hospital. There was vomiting, some temperature, and some jaundice. I opened the abdomen and found a mass behind the duodenum at the junction of the common duct with the duodenum, and there was a stone about the size of Dr. Watkins' specimen. I incised both walls of the duodenum, and removed the stone. It is not at all unlikely that the stone shown to-night may have been in the common duct and ulcerated into the duodenum, then passing down the intestine. It is possible there may have been old adhesions in the abdomen which caused the obstruction where this infection was found.

DR. WATKINS (closing the discussion).—I may add to this report that there were no adhesions except those mentioned. All the adhesions were recent, and as this patient had always enjoyed such good health there was no reason for the formation of old adhesions. I think we can state that it is improbable the stone was held at that location by the presence of any adhesions. I hardly believe it ulcerated through into the duodenum, because if that had been the case the woman would have been ill before the acute obstructive symptoms appeared.

DR. THOMAS J. WATKINS read a paper entitled

THE TREATMENT OF PUERPERAL INFECTIONS.

(A STUDY OF CASES TREATED DURING THE LAST FOUR YEARS.)

A tabulated report was presented. This report comprises sixty-one cases, and nearly all of them were treated at Wesley and St. Luke's Hospitals. Most of the cases were severe infection, as the mild cases are usually not referred to the hospital. A number of patients had been curetted once or twice, had had intrauterine treatment, had gotten worse and were sent to the hospital; twenty-eight of them had a temperature of 103° +. In thirty-three cases the temperature was less than 103°. Twenty-eight of them had an inflammatory exudate in the pelvis. This is the same number that had a temperature of 103° +, but there were nine cases with pelvic exudate with a temperature of less than 103°. Six patients had a suppurative peritonitis.

Blood examinations were made as a routine in all the cases. The leukocyte count varied from 5,000 to 58,000, and there were very few that were of any great amount of interest. The increase in the leukocyte count was generally in proportion to the amount of febrile disturbance.

Bacteriological examinations to determine the variety of the infections were not made in many cases and were usually disappointing in results. Gonococci were found in only three cases. Bacteriologic examinations, it seems to us, are often unsatisfactory and the findings as yet are of no practical value in the treatment.

Complications.—There were the following complications: Iliopsoas abscess ," non-tubercular," one; pyemic abscesses, one; pneumonia (lobular) probably embolic, five; phlebitis, two; intestinal obstruction, one; acute nephritis, two; many of the cases, however, had some albumin and occasional casts.

Treatment.—The treatment employed is somewhat routine. A careful history is taken and a complete physical examination made. If the fetus is still *in utero* and miscarriage unavoidable and the cervix not well dilated, the uterus and vagina are packed with sterile gauze. This is done irrespective of the amount of temperature. It is left in from twenty-four to forty-eight hours, depending upon the results. It is repacked if there is not sufficient dilatation to empty the uterus without much traumatism. It is not uncommon to have the gauze, fetus, and secundines expelled spontaneously. If the fetus has been expelled the uterus is explored to see if it is empty, if indicated by the presence of *hemorrhage* or *offensive uterine discharge* except under conditions mentioned later. If there is no *hemorrhage or offensive uterine discharge*, the uterus is considered empty. It is possible but not probable for it to contain some secundines in the absence of hemorrhage and offensive discharge, but in this event if left alone the discharge will soon become offensive. If the uterus is small and well contracted even in the presence of a slight offensive discharge it is not explored. The uterus is explored and emptied preferably with the finger.

To pack the uterus and allow it to empty itself is always good treatment and is especially good treatment, even with a dilated cervix, to be employed by the inexperienced or to be used where the surroundings are unsuitable for surgical work. The harm resulting from retention of some of the secundines has been very much overestimated, and there is not such an urgent demand for its immediate removal as would be indicated from the literature. This is well illustrated by the experience of dairymen. Cows often have retained placentæ; they become infected and offensive, but they are always expelled spontaneously about the ninth day and they apparently never cause death. The finger may be aided by a placenta forceps or a large curette.

After the uterine cavity is emptied no more intrauterine treatment is indicated and it is left alone. An intrauterine douche is always dangerous and is practically useless. There is very little objection to wiping out the uterus at this time with gauze, but this is probably of very little value. There is no indication to use any drain, as it will drain itself. The use of gauze in the uterus would interfere rather than facilitate drainage and it always increases decomposition. Better drainage is accomplished by elevation of the head of the bed. If there is any infection about the vulva, a wet dressing is kept over it to prevent the coagulation of the discharges and to thus facilitate drainage. No vaginal douches are used; they often do harm, cannot possibly be of much service, the nurse will usually introduce more infection than she will remove, and they are disturbing to the patient. After all that has been said against the use of douches in these cases, physicians quite generally employ vaginal douches frequently and often subject the patients to the dangerous intrauterine douche.

There has been much said about the "protective leukocyte wall" that is formed in the uterus in cases of infection and of the importance of not disturbing this by curettage, treatment, etc., but we believe there has not been enough said about the thrombi that close up the uterine sinuses, which readily become infected and often produce serious trouble by being dislodged with intrauterine treatment. *In cases of pelvic exudate we seldom explore the uterus*, even if there is some suspicion of retained tissue as these cases are especially liable to be made worse by intrauterine manipulation.

The peritoneum is considered to be involved when there is pain; absence of pain means absence of peritoneal involvement.

The uterine cavity was explored in only sixteen of the sixty-one cases, and the uterus and vagina were packed with gauze for the purpose of emptying the uterus in eight cases. In thirty-one of the cases the only treatment employed was the use of means to build up the physiologic resistance.

The supportive treatment consisted chiefly in building up the physiologic resistance. The routine of it consisted in the following:

1. Forced nutritious diet.
2. Attention to elimination.
3. Relief of pain.
4. General hygienic treatment, especially fresh air and sun baths.

Indications for Supportive Treatment.—Much attention was paid to the building up of the physiologic resistance in all of the cases, and in sixteen of the cases with a pelvic exudate it was the only treatment used. After excluding the necessity for exploration of the uterine cavity or after the uterus had been emptied the patients were put upon this treatment. This treatment was then continued if the patient improved. In the great majority of cases where the patients were very ill they were put upon this treatment as a test to determine whether the tendency was to improve or do otherwise. As soon as we seemed certain that the tendency of the case was to get worse we resorted to more radical procedures except in hopeless cases. We learned, however, that in a number of the cases the patient would have a recurrent attack of fever lasting for a few days and then would go on to recovery. This occurred in a number of cases where there was a large pelvic exudate. In some of the cases the exudate extended down to the side or posterior to the vaginal canal, and in some the exudate extended upward as high as the crest of the ilium and nearly to the umbilicus.

Our knowledge as yet has given us nothing that is so valuable in the treatment of puerperal infection as the building up of the physiologic resistance. In the cases of pelvic exudate or suppuration the systemic infection is much more important than the local infection. In a majority of the cases the exudate or the pus will become sterile in two or three weeks without operation. With operation there is little or no hope of shortening the duration of the febrile disturbance, and in cases of exudate there is considerable probability that the duration of the infection will be increased by incision and drainage, as this is very liable to result in a secondary infection. The serum treatment of puerperal infections has proven as yet to be of little or no value.

We believe that resistance is best increased by nutritious diet and for this purpose milk, beef-juice, and eggs were chiefly depended upon. An ice-bag was placed over the abdomen for the relief of pain and it may have had some local value. Much care is given to see that the patient sleeps six or eight hours out of the twenty-four. Codein or morphine is given in sufficient quantities to insure rest and generally in sufficient quantities to relieve pain. Fluids are depended upon chiefly to stimulate elimination. If patients do not take two quarts or more by the mouth in each twenty-four hours salines are given by the rectum. We occasionally use the drop method with the foot of the bed raised in the very bad cases if postural drainage is not indicated. We believe this to be especially indicated where the tongue is dry, where the stomach is disturbed, and where the kidney excretion is small. Sun baths and fresh air were given in abundance. We have been especially careful not to disturb the patients by treatment as we believe the cheerful state of the patient is of extreme importance, as it aids much in giving them an appetite, in the digestion of food, and in procuring sleep. In the majority of cases of puerperal infection the body will develop an immunity or will destroy the infection in the course of two or three weeks with the above-outlined treatment.

Vaginal section was made in eight of the sixty-one cases. Three of the cases of vaginal section had suppurative peritonitis and were fatal. In the other five cases it was done after the supportive treatment alone failed to give desired results and was used more frequently in the earlier than later cases.

Abdominal section was done in three cases. In one case of abdominal section a solid exudate was found involving the right broad ligament, the right ovary and tube, the appendix, and the head of the cecum. This was done after the very acute symptoms had subsided, when the condition of the patient seemed to be at a standstill. The operation was entirely explorative as it was found impossible to remove the inflammatory mass without doing great injury to the intestines. The patient went on to complete recovery and the mass had entirely disappeared when she left the hospital. One case was for intestinal obstruction and the other secondary to vaginal section and drainage in a case of gonorrheal infection. There were six cases of suppurative peritonitis and they were all fatal. Three of them had vaginal section and drainage. Abdominal section was made in none of them as their conditions were so serious that it seemed to offer no hope.

Length of Time in Hospital.—One week or less, twenty-one. This included six fatal cases and included none with pelvic exudate; one to two weeks, twenty; two to three weeks, nine; three to four weeks, two; five weeks, two; six weeks, three; seven weeks, one; eight weeks, one; nine weeks, one; twelve weeks, one. Cases with pelvic exudate averaged twenty-five days. This gave an average of sixteen days for all cases, and an average of a little over seventeen days for the patients that recovered. Six of the seven fatal cases had general peritonitis, probably streptococci, and died before they were in the hospital one week.

Fifty-four recovered and seven died. In the cases of recovery eight of them had a slight thickening at the site of the exudate on leaving the hospital. Two of them went home with some exudate before the febrile disturbance had entirely disappeared. One case had a considerable mass 2 or 3 inches in diameter in the region of the left ovary and tube at the time of leaving the hospital. She was advised, but declined an abdominal section.

Deaths.—One patient had a general suppurative peritonitis and died in a very few hours after admission to the hospital. She was so ill that there was very little treatment given. One other case came in in nearly the same condition and died in twenty-four hours. Four other cases had general suppurative peritonitis and died in a few days after admission to the hospital. In three of them we made vaginal section and drainage which was of no value. These six cases were so ill that recovery seemed hopeless. One case died after a vaginal section and drainage. She was admitted to the hospital with a large pelvic abscess which was opened and drained through the posterior vaginal fornix. She improved for a few days when a second abscess was found, which was opened up through the old sinus. Slight improvement occurred after this, but a general suppurative peritonitis followed and death resulted. It is possible that an abdominal section in this case with a radical operation would have resulted in recovery. She died on the twentieth day after admission to the hospital.

The amount of medication used in these cases has been comparatively small. We seldom use stimulants of any kind and believe that alcoholic beverages are seldom of use and often do much harm. We have given no tonics except occasionally and then only with the hope of increasing the appetite for food. There is no evidence that ergot to produce uterine contractions is of any value. It increases the danger of dislodgment of the infected thrombi in the uterine sinuses, and there is no special value to be expected from uterine contractions. The bowels are usually moved by the use of saline enemas and occasionally by the use of purgative enemas. It is not found necessary to give cathartics very often by mouth.

These cases have helped to teach us that the systemic infection is much more important than the local infection and that the systemic treatment is more important than the local treatment; that the most important systemic treatment consists in supporting and increasing the physiologic resistance; that the infection like most bacterial infections will last until an immunity develops; that this immunity will vary with the variety of the infection with the virulence of the variety and with the resistance of the patient; that there is more danger of doing too much than too little; that it often requires more courage to avoid radical procedures than to perform them; that the energetic local treatment generally used is more dangerous than the infection.

DISCUSSION.

DR. HENRY BANGA.—I subscribe to the chief points Dr. Watkins has brought out in the treatment of puerperal infection. Especially do I agree with him that the question whether the uterus needs curetting should be decided by digital exploration. As soon as a woman in private practice has fever counsel is sought, with the result that the patient is curetted. If she does not improve at once, another consultation is held with another man, who advises another curettage. I have seen in the Michael Reese Hospital patients who, within a few days, were curetted half a dozen times in a vain endeavor to cure puerperal infection in cases where the trouble was entirely outside of the uterus.

I also agree with Dr. Watkins that we should not use intrauterine douches. I think they excite uterine contractions, and thereby induce new absorption, by stirring up circulation in the lymphatic vessels. It is quite common to see the temperature suddenly shoot up after such a douche.

I indorse also Dr. Watkins' conservatism in the treatment of cases with exudates. It is sometimes wonderful how large exudates will become absorbed if we only give them time enough to do it. If we could always prevail upon these patients from the start to stay in bed, to remain quiet as soon as there is the least rise of temperature or pain in the abdomen, no doubt many exudates would not develop at all. I like the use of an explorative needle in drawn-out cases to determine whether an incision could release pus.

The doctor mentioned infected thrombosis of some vein in the neighborhood of the uterus as the starting-point of general infection. I saw such a case the first time about two years ago in consultation, a week after confinement. The woman had had several chills, followed by high temperature, before I saw her.

She complained of some pain deep in the left side. At the time of the consultation there was no temperature. The uterus appeared freely movable, without pain. To its left I felt something cord-like, about two inches long, slightly tortuous, rather hard, somewhat tender to the touch, of the thickness of a lead-pencil, and extending laterally toward the ischium. I recognized this to be a thrombosed vein and decided to treat the case expectantly, notwithstanding the radical recommendations by some Germans for operative interference in such cases. A few days after that first examination the pain in the pelvis became quite severe, constant; there was high intermittent fever, marked by severe chills, while a gradually increasing swelling of the left gluteal region appeared, which in the course of another eight days spread to the thigh, especially the outside of it, where finally a large phlegmon was incised. While this was going on for about three weeks on the left side, all at once she had an intense pain set in in the right gluteal region. We could not detect anything on that side. The leg was not swollen. The uterus was movable, and there was nothing to be felt like I had first felt on the left side. The patient finally got well, with ankylosis of the left hip-joint, and also considerable stiffness of the right hip-joint.

I will mention another case of thrombus in connection with puerperal infection, which I saw some thirty-two years ago, and which illustrates most strikingly the pathological and clinical features of this class of cases. At the obstetrical clinic in Basel, where I was an interne, a woman, a few days after confinement, developed puerperal infection. We could not detect any localization. There was no swelling of the legs. She had violent chills. These chills would come at times daily, then, again, at intervals of four or five days. After the poor woman had had about sixty-eight violent chills within six weeks she died. At the postmortem examination it was found that around the uterus conditions were apparently all normal; but there was in the vena cava a thrombus, about three inches long, which was attached on the left side of the inside of the blood-vessel, leaving three-fifths of the width of the vein free for the passage of the blood. Of course, originally this thrombus of the vena cava must have had a direct connection with the region of the uterus.

It goes without saying that *intra vitam* the true condition was not recognized. The case had been diagnosed as one of ulcerative endocarditis, due to puerperal infection. However, the heart was found normal.

DR. RUDOLPH W. HOLMES.—I believe that it would be invaluable if Dr. Watkins' paper could be printed in appropriate form and sent broadcast to the general practitioners because there is so much woeful ignorance on their part in regard to the best and modern treatment of puerperal sepsis. It is simply appalling the one idea regarding the treatment they have, and the manner in which they carry it out. I have seen a woman with brain abscess, another with pneumonia, etc., who were curetted and douched for the purpose of curing puerperal sepsis. The average general practitioner pays no regard whatever to the location of the sepsis, but all cases of temperature in the puerperium are considered eligible for the douche and curette, and they use these measures promiscuously. Furthermore, they almost always do it without any regard for cleanliness. They consider the woman infected and she cannot be any more so by their manipulations, and they go ahead. I have had the unfortunate opportunity of seeing coroner's cases of criminal abortion, and I have rarely seen any signs postmortem of the women having been prepared for the operations they underwent, either for the criminal procedures or the secondary treatment for the sepsis. In some cases the hair was dirty, matted, evidently the accumulations of months or years. They would curette these women without washing the parts. The only ones that have been shaven have been those who died in large hospitals.

I believe in the use of ergot in small tonic doses, not in full doses, and so far as I have been able to see, it is beneficial. It keeps the uterus contracted down. It keeps the sinuses smaller, whereas large doses, given two or three times a day, would perhaps produce contractions and dislodge the thrombi.

Dr. Watkins speaks about the perniciousness of the use of the vaginal tampon, after the uterus is emptied, as it interferes with drainage. I think there is an equally valid objection to the use of the tampon to stimulate the uterus to act and expel the contents of a septic abortion in progress. On the other hand, I believe it is a safer plan to use the tampon than roughly dilate the os uteri and then attempt the emptying of the uterus by a curette.

Dr. Watkins makes a very clear differentiation between putrid infections and those that are due to pus germs; that in the case of pus germs there is very little necessity for exploring the uterus, whereas with putrid infection it should practically always be a routine part of treatment. I remember very well going out of town one night to clean out the uterus of a woman who was camping out. She had a temperature of about 103°–104°, which had continued for some days. The attending physician said that he had removed all of the placenta, but still the woman had a foul discharge. I manually removed one-half or three-quarters of the placenta. She had a severe rigor afterward; her temperature went up to 107°. In the morning the temperature was normal and continued so. This case illustrates the necessity of exploring the uterus to see whether it is emptied of putrefactive material or not.

As regards the recognition of trouble outside of the uterus, there is great difference between the discovery of tubal involvement in a case of abortion and in advanced pregnancy. Usually, at an early time, the tube will drop down and it may be palpated. In advanced pregnancy, from the nature of things it will not drop down, and it will fail of recognition. I have in mind the wife of a physician, the daughter of one of our well-known pathologists, who died as the result of a tubal abscess due to the colon bacillus. All the prominent men of Chicago in that day, surgeons and gynecologists, examined this woman and advised as to the treatment of the case, but not one of them recognized the tubal trouble, and yet at the postmortem the tube was the real infective atrium and from which multiple abscesses formed throughout the body. I recall another case where a physician had curetted and douched daily for the better part of a week, and then I was called in consultation with a very able homeopath. The homeopath had repeatedly advised the attending physician not to douche or curette any more. It was found that each day after curetting and douching she would have another chill and an exacerbation of temperature. Finally both tubes were removed, after which she recovered.

Dr. Joseph B. De Lee.—The subject of the treatment of puerperal infection was brought to my attention very early in this way: The Chicago Lying-In Hospital Dispensary was opened in a neighborhood which was infested with midwives, and the number of cases of puerperal infection received in the first two years was very large. The treatment in vogue at that time was to clean out the uterus. Douches were given three or four hours apart, the uterus packed, or a drainage-tube put in, constant irrigation of the uterus was practised, etc. After two years of that experience, I discovered that the patients uniformly got worse. I very seldom noticed any real improvement in the cases as the result of this treatment. Others that had refused treatment got well also. I then began to treat these cases expectantly, and the results were simply astonishing, and within six months I thought it incumbent upon me to read a paper on the subject and report those cases. There were sixty-one cases reported at the end of two and a half years' experience, and I came practically to the same conclusions which Dr. Watkins has brought out, and read a paper on the subject at the Chicago Medical Society. This paper evoked a storm of disapproval, because it was such a change from the active treatment of the previous time. There were very few writers at the time who took that position, and consequently I had very little authority to back me up. Two years ago I read an article by Mermann in the *Archiv. für Gynekologie* in which he reports seventy-three cases of puerperal infection of the severe form that received practically no treatment. They were given placeboes, without any treatment whatever, and the results were as good, if not better, than those reported by other men who had used all kinds of treatment. The article is not only interesting, but it is very important for those who treat such cases to read. I think, therefore, the suggestion of Dr. Holmes to have Dr. Watkins' paper printed and furnished to general practitioners is a good one. I would suggest, too, that it be printed in red ink.

From several discussions I have read of Dr. Watkins', I understand that he recommends going into the uterus in all cases and cleaning it out with the hand or with the curette if there is material in it. I thought Dr. Watkins was more circumspect about going into the uterus, even if there was decomposing placental tissue in it.

Dr. Watkins.—With pelvic exudate, I would not. Without exudate, I might not.

Dr. De Lee.—That is the opinion I have. If there is decomposing material in the uterus, it is not always a safe procedure to go into it.

Dr. Holmes is to be congratulated on his case that had a temperature of 107° and recovered after curettage. I can tell him of a case where the same procedure, namely, the removal of a large amount of decomposing tissue from the uterus, immediately changed the aspect of the disease from a mild to a severe case, the patient dying in a few days. I can also report a postmortem which I had the opportunity to see, where, on the nineteenth day of an uneventful puerperium, there having been no real sickness on part of the patient, but simply a profuse lochial flow, with the passing occasionally of clots, yet manual curettage of the uterus, under aseptic precautions, in a good European clinic, produced a chill and rapid sepsis, with death at the end of four days. Curettage of the uterus is not such a simple matter even if there is placental tissue left behind. I would be inclined, therefore, to hesitate a long time before going into the uterus, even if I knew there was something there. If we have the ordinary saprophytic infection to deal with, it will come away of itself without severe sickness on part of the patient, and if it is streptococcus or pus infection, going into the uterus will make the matter much worse. That does not mean that in all cases where the uterus is full of decomposing placenta I would not clean it out. It means great caution.

A few words with reference to the use of ergot. I am inclined to believe with Dr. Watkins that the condemnation of ergot is correct in one respect, *i.e.*, in cases of puerperal infection which have been going on for several days or weeks. If ergot is given from the beginning of the puerperium or sickness, it will cause the uterus to contract, and it has been proven by Ahlfeld that a contracted uterus absorbs less than a relaxed uterus. In fact, the old English practitioners used to feel that a contracted uterus was one of the best barriers against infection.

Dr. Banga said that his case of hydatidiform mole had pains, then fever, and after the uterus was emptied the temperature went down, and he believes that the pains caused the fever. My experience has been that when a patient gets temperature, when there is something in the uterus, the temperature causes the uterus to contract, and that the temperature in his case was not caused by the contraction of the uterus, but the temperature caused the contraction of the uterus. You will notice in a case of long labor, where, after the rupture of the bag of waters, the woman gets a slight temperature, the uterus acts better immediately. I agree with Dr. Watkins about leaving the uterus absolutely alone in all cases where there is an irritation of the peritoneum or a beginning peritonitis, around the uterus, whether there is anything in the uterus or not. That point has been emphasized for many years. I also wish to emphasize the policy of noninterference, and if that could go forth throughout the land, the number of deaths and severe cases of puerperal infection and of phlegmasia alba dolens would diminish remarkably.

Regarding the use of serum, I have had only one case in practice where there was some effect from the serum out of a hundred cases. We at first did not administer the serum in large doses. I have administered as much as 200 c.c. in thirty-six hours in these cases, and, as a rule, have not seen any effect, but I still use it.

Dr. Watkins did not speak about collargol. Probably he has not used it with any benefit and therefore did not mention it. Collargol, in my experience, has been useless. I have given it in several cases, and in one or two apparently got some effect. Whether or not the effect contributed to the ultimate recovery of the patient, I have never been able to convince myself. Methods of administering silver salts per rectum and through the skin are absolutely futile. Salt solution, I think, really does more good than one would infer from Dr. Watkins' paper. The principle of flooding the system with large amounts of salt solution is a good one, and I have no doubt the tendency to recovery is greatly enhanced by it.

Regarding the operative treatment: when I read reports of treatment of other operators, who have resorted to extirpation of the uterus, ligation of the veins, vaginal section and drainage, vaginal section and packing the uterus with iodoform gauze, I always feel as if I was neglecting my patients and not operating enough. But then, by glancing over the history sheets of my patients, I am reencouraged because I find that with the non-operative treatment patients do as well, if not better. In cases seen in consultation where operation has been advised, more often the conditions have not appeared to be amenable to operation. In a case of peritonitis, where you have opened up and drained, where the whole peritoneum has been infected, a more extensive operation may be indicated. I have not yet had a case where I could make up my mind there was an abscess in the uterus or a spot there from which the infection was proceeding, and extirpation of the uterus was indicated.

Regarding the removal of pus tubes, in the class of cases under discussion, I have yet to see a case where such a procedure would be justifiable. Operating on acute septic cases, with removal of parts of the genital organs, has not been very encouraging. Theoretically, one can see why. The infection is nearly always general, very seldom local.

DR. CHARLES E. PADDOCK.—I must disagree with the last speaker regarding the removal of any part of the ovum which may be left in the uterus following an abortion. It is not always easy to decide what infections we have to deal with or whether it has gone beyond the endometrium, but usually we can. I do not believe we will cause further trouble by a thorough exploration and removal by the finger of any part of the ovum in the majority of the cases that show an elevation of temperature with a uterine discharge presenting putrefaction, which is evidenced by a putrid odor. There are cases when we can determine at a glance that the infection has passed beyond the endometrium. In such I would advise leaving the uterus alone.

I do not follow the advice of the essayist by consuming twenty-four hours or more in the dilation, but do it at once, under an anesthetic and curette with the finger.

DR. CHARLES S. BACON.—This is a very big subject and cannot be satisfactorily dealt with in a limited discussion. I notice that about three-fourths of the cases reported are instances of abortion of the first two or three months, and only about one-fourth of them were cases of puerperal infection at term.

The treatment of intrapartum infection during abortion is perhaps somewhat different from the treatment of postpartum infection, and even the treatment of infection postabortum is different frequently from the treatment of infection after labor at term. Confining my remarks to postpartum infection either at term or after abortion, I would suggest that it is very important to differentiate between localizations of the infection. We have two general classes, namely, infections of the uterus and infections outside the uterus. Infections of the uterus, the endometrium, or the uterine body constitute by far the larger proportion of cases, the milder cases, the early cases, as a rule, and a considerable number of the more serious and longer infections.

Some years ago I read a paper by Bumm from which I derived a good deal of benefit in which he called attention to the great importance of drainage in cases of uterine infection. When the uterus is infected, it is like any other suppurating cavity, and if the drainage is good, there are not generally severe symptoms. If the drainage is not good, then trouble arises. In cases of septic endometritis, or in cases of saprophytic disease, drainage may not accomplish as much as one desires, but where there is generally at the beginning not good drainage, and the lochia stops, the first indication is to start drainage, and this can be done by massage of the uterus, removing any obstruction in the uterine canal, and that may be all that it is necessary to do. Frequently, I think, good catharsis acts like intraabdominal massage of the uterus by the intestines and starts up the drainage from the uterus. That is true whether the uterus contains much débris or not. If the drainage of the uterus is free and the discharge continues, that may be all that is necessary, but in case that does not suffice and we are fairly satisfied that the trouble is confined to the interior of the uterus, I do not see how we can avoid investigating the interior of the uterus. We sometimes see cases where at the start we know there is intrauterine trouble, where there has been perhaps a portion of the placenta left inside. We see cases that have been delivered by midwives where undoubtedly there is a large amount of débris left in the uterus, and it is a great waste of time, I believe, to wait in these cases. The uterus should be emptied either by the use of the finger, if that can be done—but it is not so easily done in all cases of post-partum infection at term—and if not, a careful use of the curette will be of advantage. If the uterus has been carefully curetted, that should be the end of these manipulations, and I quite agree with the essayist and with the other speakers that the practice of repeated curettings and douchings of the uterus is harmful and almost criminal. Occasionally we have with uterine infections such a deep involvement of the walls of the uterus that it is impossible by any means to remove all of the greatly infected uterine wall. I have seen one or two cases of that kind, and one in particular in which I wish I had removed the uterus; on account of the condition of the patient I was afraid to do it. The patient afterward died, and we found the trouble was confined chiefly to the uterus. I always regretted that in that case hysterectomy was not made. Such cases are rare, but once in a while they arise.

We come now to the infections outside of the uterus, or that have passed beyond the uterus. We have those in the cellular tissue outside, pelvic abscesses; we have infections that involve the peritoneum of gonorrheal origin, and some of them due to the streptococcus and to other septic organisms. Then we have thrombotic infections. We have the cases where the uterus is apparently no longer involved; the uterus is small, and not tender; there is no evidence of uterine infection, where there is absolutely no evidence of pelvic abscess, and still the patient is in a serious condition. There may be some involvement of the endometrium, and later, if the patient survives, we may find abscesses in other parts of the body. I have been in the habit of considering these cases of general sepsis, and without being able to determine the localization, the question is, I think, a very important one to decide. Are these cases to be separated from those of infection by septic thrombi? This point was also raised in the relation of the interesting case by Dr. Banga. Certainly, in these cases of general infection only conservative treatment is indicated unless we have any reason to believe there are infected thrombi. I have never been able to decide that there were infected thrombi, as the diagnosis was too difficult, and have not acted upon any probable diagnosis. That is one of the most important questions we have to solve in these serious cases.

Going back to the cases of pelvic abscess or pelvic exudate, I quite agree that they should be let alone until there is evidence of suppuration, and that evidence is extremely difficult to find. But I doubt whether we can ever give a prognosis as to the outcome and the length of time these cases remain in the hospital. Instead of seventeen days, as in Dr. Watkins' cases, I have found these cases to last frequently for many weeks, but finally the symptoms disappeared or resolved without suppuration. Whenever the presence of pus can be determined, we have then a very interesting question to decide, namely, whether we shall open from below or from above, and if from above, whether we shall operate extraperitoneally or not. In the case of peritonitis, while these cases are very nearly always, if not hopeless, extremely serious, I have come to the conclusion largely from reading some recent literature on the treatment of peritonitis that drainage is always desirable in the severe cases and in the later stages, and drainage established in the easiest and simplest possible way.

But the points that I wish especially to emphasize are that it is extremely important to make a diagnosis of the localization of the infection, whether it is in the uterus or outside, and if outside, where? And the progress of the case must determine the line of treatment. There is no uniform rule that can be laid down, but the general spirit of the paper is that of conservatism, which no doubt is the proper one to guide us.

DR. A. BELCHAM KEYES.—I believe when we use the term puerperal fever, we include a wide field of surgical infection. The remarks of Dr. Paddock and Dr. Holmes are very appropriate, namely, that where there are secundines or parts of the placenta left *in utero*, the natural procedure would be to empty the uterus. Like Dr. Holmes, I have had many cases where a high temperature dropped rapidly to normal after pursuing this plan. This brings us to the classification of Duncan, in which he calls this "*sapremia*" due to toxins generated within the uterus from the retained secundines as the real cause of the fever. I believe we should be careful to divide these cases into classes. Where there are secundines left behind they should be removed with the finger or the placental forceps, but not with the sharp curette. If the temperature does not drop and if the fever continues, or the patient has repeated chills and fever, we may reasonably conclude that it is not a simple sapremia, which we could not decide before the removal of the secundines from the uterus.

So far as the treatment of thrombosis is concerned, I have seen cases of abscess of the lung develop, also abscesses in other parts of the body, and avoid curettage or manipulations of any kind if I think there is any thrombosis. In all cases of abortion I am extremely careful and watchful for the complaint of pleuritic pain on part of the patient.

I do not think we can say that puerperal fever in every case shall be treated by this or that particular method, but that we should try and differentiate between sapremia, septicopyemia, and thrombophlebitis of a purulent character, and to give a stereotyped treatment in all cases is impossible. Without trying to remove the secundines, we cannot tell whether we have sapremia or septicemia to deal with. The expectant treatment in early abortion was long practised by Dr. Bartlett, of this city, who has advocated the nonremoval of secundines, but the simple exhibition of ergot.

Dr. George Schmauch.—I would like to say a few words in defense of the general practitioner. I oftentimes think that injustice is done to the general practitioner in referring to him in the manner done not only to-night, but also in newspapers. I think it is more reasonable to blame those men who teach obstetrics and gynecology than general practitioners. Dr. Holmes in a statement he made conveyed the idea that where curettement is done every woman should be shaved. I have grown up in a large clinic where there were from fifteen to twenty curettements done a day, and not one of those women was shaved. In a large hospital with over five thousand obstetrical cases treated, there was never a woman shaved. I do not think shaving of the external genitals has any influence on puerperal infection. The germs living on the vulva are identical with those in the vagina. It is wrong to publish ideas like that, blaming the poor general practitioner for omitting the shaving.

In regard to digital exploration after labor, I might say that the uterine cavity to me has been sacred. I never explore the uterus postpartum unless I have to do it. Even when an examination shows that there is a little placental tissue left, even when there is hemorrhage, in private practice, I can wait. But, all things considered, there is not much advantage in waiting. The result is we have to remove a placental polypus afterward. But the development of a placental polypus is not identical with infection. (In fact, I think it less dangerous to remove a placental polypus on the tenth or twelfth day than to explore the uterine cavity right after labor.) As long as there is some placental tissue left in the uterus which is undergoing decomposition, it should be removed. So it would be better to teach medical students and general practitioners to understand and learn whether the placenta has been completely cast off or not, instead of teaching them to explore and enter the uterine cavity after labor. We know very well that in a normal case, where there is no infection, the cervix closes on the fourth and fifth day; you do not have to go in with the finger, and if there is retention of a bigger piece of the placenta there is an excessive hemorrhage on the sixth day. The membranes should never be removed. Retained membranes are not identical with infection.

There has been much work done in the last five years to explain the etiology of puerperal fever. I certainly appreciate

Dr. Watkins' paper and its conservatism, but from the time I studied obstetrics and practised it some sixteen years ago, I never have heard anything else, that is, I never knew of any other treatment than the one brought out to-night; and all our examinations of the blood and investigations with regard to the infectious agent do not give us any results so far that are of value. We come to the conclusion that it is most frequently the hemolytic streptococcus which brings about septic processes, and that its virulence is quite complex, and not only that, but even the resistance of the female body is of a complex nature which we do not clearly understand as yet. Those gentlemen who have large practices have lost cases they have treated and which they thought were perfectly clean. They have hardly made an examination, and yet patients develop puerperal sepsis. There are many such examples in the history of obstetrics. I need only remind you that one of our greatest German gynecologists and obstetricians, Schroeder, lost two of his daughters through puerperal infection. There is doubtless an autoinfection but we do not understand it yet.

In regard to febrile abortion, a condition discussed by Dr. Watkins, in a large clinic in Berlin where we treated many cases of this nature, there were certain rules adopted. Every case of abortion that had a certain temperature was regarded as a septic abortion. The temperature limit was 102°. Every case that had that temperature was treated at once; there was not the least delay, and we did not resort to tamponing of the uterus with iodoform gauze. We used laminaria tents, giving a chance to remove the fetus within twelve to twenty-four hours. This is the first thing to do. Only a small percentage of these cases develop sepsis.

The most interesting of all the cases mentioned by Dr. Watkins was the one of parametritis where he opened the abdomen without interfering with the exudate and the patient got perfectly well afterward. There are physicians who do not believe exudations will disappear after a certain time. We have been generally taught that in cases of parametritis, where the fever lasts for three or four weeks, an abscess forms; still there are exceptions. I do not know what the gentlemen mean by infected thrombi. We get thrombophlebitis in pregnancy and puerperium, which is a comparatively harmless disease, while pyemia is a dangerous disease, but I do not know what the gentlemen mean when they use the term infected thrombi.

Dr. Watkins (closing the discussion). The question as to what exudates we may expect to become absorbed and those which will not is largely speculative, but I feel quite firmly convinced that if there is no chronic gonorrheal infection, the probabilities of absorption are good, so I believe it is always well to examine the urethra to see whether Skene's ducts are infected; whether there is a cyst of the Bartholinian glands, etc. These cases of chronic gonorrhea are apt to require operation, which can generally be postponed until the acute symptoms have disappeared. Quite a number of exudates are in very close contact with the bowel; they are adherent to the bowel, and some of these cases get a secondary colon bacillus infection; there suppuration is apt to occur and may require incision and drainage.

There has been a good deal said about determining whether the infection is general or local. I think that can be done easily. If a patient has fever, we may safely conclude that the infection is general. If our examinations were sufficiently delicate, we would find the patients with fever had toxins and bacteria in the blood. The seriousness of thrombosis has been overestimated. We have seen a great many cases of thrombosis involving the femoral veins, and in some of them the pelvic veins have been involved, and yet most of these cases go on to recovery.

General puerperal peritonitis is very different from general appendicial peritonitis. Practically all cases of general puerperal peritonitis are streptococcic infections, and there is very little hope of recovery.

Pyelitis is quite common in infections of the puerperium. I haveseen such cases, but not among the sixty-one cases reported.

As to a contracted uterus resisting infection better than the flabby uterus, of course it does. In very severe cases of infection the uterus does not have as much tonicity; it is often paralyzed.

Relative to packing interfering with the discharge, in many of these cases where there is hemorrhage, the packing is done largely to dam back the blood, to separate the secundines, and to bring on contractions which will dilate the cervix and which will often empty the uterus.

As to the indications for exploring the uterus, I will still abide by what I said in the paper.

As to whether the exudate is suppurative or not, that does not make a great deal of difference. Most of these pelvic exudates have minute collections of pus. In the nonpuerperal cases, with suppuration, the pus becomes sterile in two or three weeks, and in these cases of small abscesses the pus becomes sterile in two or three weeks. Suppuration is no indication for immediate operation. The division of these cases of infections into those at term and infections before term is very much like dividing infections of the hand of children and adults into separate classes.

Dr. Schmauch spoke of the use of laminaria tents. I would not quarrel with him as to the relative value of tents or gauze. Personally, I prefer gauze.

As to the removal of sloughing secundines, or small particles of it, I believe we are apt to have a pretty strong prejudice about it. I think we may compare it to some extent with treating a slough of the hand after a bad infection; there we would not cut and scrape; we would put on a wet dressing, and allow it to take care of itself, and this would apply to the uterus.

REVIEWS.

MYOMATA OF THE UTERUS. By HOWARD A. KELLY, M. D., Professor of Gynecologic Surgery at Johns Hopkins University; and THOMAS S. CULLEN, M. B., Associate in Gynecology at Johns Hopkins University. Large octavo of 700 pages, with 388 original illustractions by August Horn and Hermann Becker. Philadelphia and London: W. B. Saunders Company, 1909. Cloth, $7.50 net; Half Morocco, $9.00 net.

This magnificent volume is a companion to the well-known work of Cullen on Cancer of the Uterus, published in 1900. It is a model of sumptuous book-making. The illustrations are remarkable for beauty and are printed in duotone ink on a highly surfaced paper that brings out every detail.

The general plan is the same on that of the previous volume on Cancer. The volume dealt almost exclusively with work done by those connected with the gynecological department of the Johns Hopkins University, and is the result of over ten years of careful labor. Its facts and conclusions are drawn from the study of the histories and tumors of 1,674 cases of myomata. It is divided into thirty-five chapters, each discussing one phase of the subject. Each chapter begins with a succinct presentation of its subject and ends with a detailed report of cases illustrating the conditions described. Because of the great importance of sarcomatous changes occurring in, or associated with myoma and the by no means infrequent association of carcinoma of the fundus with myomata, these subjects are considered at unusual length. The operative procedures described are those used at the Johns Hopkins where the mortality for the last three years has been about 1 per cent. The volume represents the best in medical book-making, both in text and in mechanical execution, and will long remain a monument in honor both to its gifted authors and to their university.

OPERATIONS UPON THE UTERUS, PERINEUM, AND ROUND LIGAMENTS. By W. J. STEWART MCKAY, M. B., M. Ch., B. Sc., Senior Surgeon, Lewisham Hospital for Women and Children; Sydney Member of the Royal Society of Medicine, London. Large octavo, pages 454, with 148 illustrations. William Wood & Co., New York, 1909. Price, $6.00.

The author's object is to describe in detail the mechanism of birth injuries, both immediate and neglected, and also to deal with the displacements of the uterus, endometritis, and dysmenorrhea in order that the general practitioner, who so commonly is "fired with a desire to operate," may find an efficient guide. The opening chapter on anatomy leaves nothing to be desired. The illustrations, largely adapted from classical sources to whom due credit is given, are exceptionally clear, numerous, and telling. For old perineal laceration McKay gives preference to Emmet's operation as described by Kelly and Noble; for complete tears, to Tait's flap-splitting method; for rectocele, to Hegar's technic. The operation advised for cystocele, however, which practically consists of denudation only, is quite inefficient, and no description or even mention of vaginal interposition of the uterus is given.

In backward displacement of the uterus Alexander's operation, ventrosuspension and ventrofixation are described in detail. Laceration of the cervix is treated by means of Emmet's trachelorrhaphy, Schroeder's amputation, and a combination of the two devised by the author. We cannot agree with the advice of removing cervical sutures under a general anesthetic. Curettage is dealt with in great detail, and the book concludes with description of a modified Dudley trachelorrhaphy for dysmenorrhea.

The text is lucid and concise, taking up *seriatim* causes, indications for interference, technic, and after treatment. Good judgment has been displayed in avoiding too much theoretical discussion, though due emphasis is given to fundamental principles. Throughout great conservatism has been used in setting forth operative indications. The plates are excellent, large and abundant. R. T. F.

MEDICAL AND SURGICAL REPORT OF THE PRESBYTERIAN HOSPITAL IN THE CITY OF NEW YORK. Edited by JOHN S. THATCHER, M. D., and GEORGE WOOLSEY, M. D. Volume VIII, 1908. Large octavo, pages 572, illustrated.

This volume contains twenty-four articles from the pen of members of the Presbyterian Hospital Staff. Some of the articles have appeared in print elsewhere. *Northrup* describes the open-air roof-wards in use at the hospital. *Gilman Thompson* fresh air in the wards and in the treatment of pneumonia. *Meakins* has experimentally studied immunization with live tubercle bacilli. *McWilliams* deals with carcinoma of the appendix. *Hart* received the Briddon prize for his essay on acetone bodies with a clinical method for quantitative estimation of diacetic acid and acetone. *Meakins* has isolated a typical streptococcus in cases of rheumatic fever; he regards the tonsil as a frequent port of entry. *Cecil's* study of the pancreas in ninety cases of diabetes mellitus is of interest. The conjunctival and cutaneous tuberculin tests have been studied by both *Shively* and by *Pelton*. The other articles, both surgical and medical deal with interesting subjects, chiefly of casuistic value.

R. T. F.

TABELLEN ZU KLINISCH-BAKTERIOLOGISCHEN UNTERSUCHUNGEN FUER CHIRURGEN UND GYNAEKOLOGEN, NEBST EINER KURZEN ANLEITUNG ZUR AUSFUEHRUNG DER "DREITUPFERPROBE." Von DR. W. LIEPMANN, Oberarzt an der Univ. Frauenklinik der königl. Charité, Berlin. August Hirchwald, Berlin, 1909. Price, 2 M.

The bulk of this little pamphlet is composed of 150 blank charts and records for noting the result of the "three-sponge test" (Dreitupferprobe). During the course of the operation suspected areas, pus or small particles of tissue are obtained on sterile gauze sponges, which are later put into bouillon, and examined for bacteria. Valuable prognostic and therapeutic hints are obtained within twenty-four hours by the simple technic. R. T. F.

AN OBSTETRIC DIARY OF WILLIAM HUNTER, 1762-1765. Edited with notes by T. NIGEL STARK, M. D., F. F. P. S. G. Octavo, 55 pages, paper, price, 1 shilling. Alex. MacDougall, Glasgow.

This short document details the first three pregnancies of Queen Charlotte, wife of George the Third. The record fortunately stops here, or we might have had to hear about the twelve succeeding pregnancies this prolific queen subsequently underwent. The editor has added several chapters dealing with the persons and scenes involved. R. T. F.

SMITHSONIAN INSTITUTE BUREAU OF AMERICAN ETHNOLOGY BULLETIN 34. PHYSIOLOGICAL AND MEDICAL OBSERVATIONS AMONG THE INDIANS OF SOUTHWESTERN UNITED STATES AND MEXICO. BY ALES HEDLICKA. Octavo, 650 pages, illustrated. Government Printing Office, Washington, 1908.

Hedlicka reports his observations among the Indians obtained during five expeditions. He describes the country, races, manners and customs of the tribes. The author has obtained numerous data, some dealing with menstruation, pregnancy, labor, care of the child, pharmacopeia, etc. This report is a valuable contribution to our medical knowledge of a disappearing race. R. T. F.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Contractions of the Pelvic Outlet.—J. Whitridge Williams (*Surg. Gyn. Obst.*, June, 1909) says that funnel-shaped pelves frequently give rise to more or less serious dystocia, are an important factor in the causation of deep perineal tears, and occasionally convert what promise to be easy low forceps deliveries into most difficult and dangerous operations. Typical funnel pelves, in which the usual external measurements as well as those of the superior strait are normal, while the distance between the ischial tuberosities measures 8 cm. or less, were observed in 6.92 per cent. of 1,200 consecutive pregnant women, and occurred with equal frequency in both the white and black races. Generally contracted funnel pelves, in which shortening of the usual external measurements as well as of the diameters of the superior strait is associated with a distance of 8 cm. or less between the ischial tuberosities, occurred in 1.19 per cent. of the white and 4.91 per cent. of the colored women, being 4 times more frequent in the latter. Typical funnel pelvis constituted 55.7 per cent. of all cases of pelvic deformity in white, as compared with 17.8 per cent. in colored women, and therefore are of especial practical importance in the former. While a shortening of the transverse diameter of the outlet to 8 cm. or less indicates the existence of a funnel pelvis, it should be regarded merely as a danger signal; as the possibility of dystocia will depend upon the relation between its length and that of the posterior sagittal diameter. The latter is the distance from the center of the former to the tip of the sacrum, and must increase in length as the transverse diameter becomes shortened. Typical funnel pelves are apparently due to the presence of six vertebræ in the sacrum—so-called high assimilation, which so changes the relations at the sacroiliac joints as to permit the lower portions of the innominate bones to approach one another. In the generally contracted type the outlet contraction probably represents only an exaggeration of the faulty development which characterizes the entire pelvis. In view of the frequent occurrence of funnel pelves, palpation of the pubic arch should form an integral part of the examination of every pregnant woman. Whenever it appears to be narrowed, the distance between the tubera ischii should be measured, and when it is 8 cm. or less, the length of the anterior and posterior sagittal diameters should also be determined. Only by so doing can one avoid being occasionally placed in the unenviable predicament of being obliged to resort to a serious obstetrical operation after having assured the patient that her pelvis was normal. Fortunately, the great majority of labors complicated by funnel pelvis end spontaneously. In the lesser degrees of contraction low forceps may give satisfactory results, while in the more pronounced cases the operation of choice is Cesarean section at the end of pregnancy or pubiotomy after the head has reached the pelvic floor.

Cesarean Section in Aged Primipara. T. B. Grimsdale (*Jour. Obst. Gyn. Brit. Emp.*, May, 1909) reports a case of Cesarean section performed for the unusual indication of advanced age of the mother. Married at forty-two, her vagina was so narrow and rigid that intercourse was impossible until after treatment. As the woman would have been forty-four years old at the time of termination of her first pregnancy the writer considered the performance of Cesarean section justifiable on account of the rigidity of the soft parts.

Extrauterine Pregnancy. J. B. Deaver (*Month. Cyclo. Med. Bull.*, May, 1909) outlines the treatment of urgent cases after rupture as follows: If the condition be very low stimulation is begun by hypodermoclysis and strychnia. If there is extreme restlessness, morphia is a valuable adjunct. They are placed on the table with as little disturbance as possible and a light, quick etherization given. Preparation is rapidly completed and intravenous transfusion of normal saline solution started as the abdominal incision is made The offending tube and ovary are removed as rapidly as possible. The clots are scooped out, and if the condition of the patient warrants, the abdomen is flushed out and filled with normal saline before closure. The writer emphasizes especially the importance of restoring as soon as possible the volume of circulating fluid by the use of normal saline solution intravenously in the abdominal cavity and subsequently by continuous proctoclysis.

The Remedies for Depopulation.—L. D'Anfreville (*Presse Méd.*, May 12, 1909) considers the methods of preventing depopulation and its causes. The causes are pathological and social. The principal causes that are pathological lie in the sterilization that is produced by gonorrhea and syphilis, preventing many married couples from having children. Another such cause is alcoholism, which deteriorates the parents and causes weakened heredity and bad surroundings for the children. The social causes are the unwillingness of couples to live moderately and to risk being able to support large families, and the desire to leave a large property to a single child. The remedies that have been tried in France are various. It has been proposed to make a law taxing the bachelor, and an income tax which will decrease in amount as the number of children increases. The better measures to try, and such as have been already successfully carried out in France, are giving aid to the pregnant woman to obtain a support without undue exertion in the latter months of pregnancy, and cheap restaurants where she can obtain good, nourishing food for herself and her children at a minimum cost. Another way of increasing population is to take care of the young infants, as is done in the consultations for infants and nursing mothers, where good milk is supplied, and good counsel given to the mother, the infant being treated when sick, and advice given as to care and feeding when well.

Hematoma of the Vulva as a Hindrance to Delivery.—W. Lippmann (*Berl. klin., Woch.*, March 13, 1909) says that hematoma of the vulva seldom is so large as to constitute a hindrance to delivery. The author details three cases observed by him in which this did, however, occur. The greater part of the arterial circulation in the labia comes through the pelvic cavity from the pelvic vessels. The venous supply comes from two sources: outside the pelvis from the saphenous veins and the femoral; the rest from the venous plexus of the vagina, which comes from the hypogastric veins through the pelvis. This portion is compressed by the fetus in labor. This condition is much more frequent in primiparæ than in multiparæ. The compression is by the head, since this complication rarely occurs in breech presentations. The subcutaneous tissue of the labia is very loose and is connected with that of the perineum. The vagina in the author's cases was compressed by the hematoma. The causes of the hematoma are the long, firm pressure on the veins by the child's head, causing venous stasis; the backward pressure of the blood through the collateral circulation; the great fragility of the venous walls of the periphery, especially of the labia majora; the unsupported condition of these veins in the labia majora. Arterial bleeding is never seen. The diagnosis is easy in presence of a dark, bluish tumor of the vulva. In order to facilitate labor it is necessary to incise the tumor, shell out the clots, and stop hemorrhage by compression while the child is delivered. After labor the wound should be treated aseptically.

Atresia of the Vagina.—Leon Pouliot (*Bull. de la Soc. Belg. de Gyn. et Obst.*, April 22, 1909) describes a congenital case of closure of the vagina by a thick band at its upper third, having a minute orifice through which menstruation had occurred. The patient was three months pregnant at the time that she applied for examination. The author believes that the orifice will become dilated at the time of labor so that the patient will be delivered in the natural way. The origin of this condition is a malformation of the genitals. They are developed from the canals of Müller. These canals have no true cavity up to a late stage in their development. For a long time they consist of a cord, and when the canal is formed, if a portion of the cells are not absorbed, a solid transverse partition will remain. This occurred in this patient in a position corresponding to the upper third of the vagina.

Therapeutics of Rupture of the Uterus and Fornices of the Vagina.—Romolo Costa (*Ann. di Ostet. e Gin.*, May, 1909) gives notes of nine cases of rupture of the uterus treated by him and a study of the therapeutics to be applied to such cases. Prophylaxis is possible. The complication occurs especially in shoulder presentations delivered by artificial means; especially version done by physicians who do not realize the increased stretching of the lower segment of the uterus by the shoulders. Forceps operations and the introduction of the hands produce this dilatation. Means for delivery should be used which will lessen intrauterine pressure and distention. Such means are embryotomy, craniotomy, and evisceration. Narcosis should not be used to lessen the forces of the patient during delivery. The woman should not be removed from her home when there is imminent danger of rupture of the uterus. There are several factors which make rupture of the uterus a serious matter. They are hemorrhage, the possibility of sepsis following the wound, the effusion of blood into the abdomen, and shock. Death from this complication more often occurs from sepsis than from hemorrhage. The latter is often stopped by the retraction of the uterine tissue itself. The first matter of treatment is to stop the bleeding and to prevent further hemorrhage. The action to be taken depends more on whether the hemorrhage is arterial or venous than upon the size or location of the uterine wound. It is more difficult to stop when the uterus is atonic than when good contraction can be obtained after delivery. Venous hemorrhage is less important and easier to stop than arterial. It is most important to ascertain at once whether the hemorrhage is arterial or venous. In a well-contracted uterus with a continuous hemorrhage of violent character we may be sure that the uterine artery is bleeding in the parametrium. If on slight relaxation of the uterus the hemorrhage is lessened and is renewed, it is venous and from the walls of the uterus itself. If, however, uterine contraction stops hemorrhage entirely or partially, and relaxation causes it to begin again, the lacerated veins are outside the uterine muscle. The most alarming condition arises when the uterine artery is ruptured. To lose time in an attempt to tampon would be foolish, even fatal. Operation is indicated at once. Cesarean section will stop the hemorrhage and deliver the child at the same time. The uterine artery becomes retracted into the tissues and cannot be found except by careful searching after laparotomy. The author believes that vaginal hysterectomy is slower than abdominal, and that the artery may be reached more easily by way of the abdomen than through the vagina. Porro's operation is contraindicated since it would reach the artery if it were lacerated in the uterus, but not if it were in the parametrium. Laceration of the uterine veins in the parametrium may be controlled by tampon. The best material for the tampon is cotton, gauze becoming soaked with the blood and acting as a drain rather than making pressure. The tampon must be aseptic, and should not be soaked with an astringent, since the thrombosis caused by the solution cannot be controlled and also because of its caustic and irritant action. In severe cases the tampon should be used only temporarily at the home of the patient, and she should be carried to a hospital. Having arrived there, in general it is best to remove the tampon, even if hemorrhage has stopped, in order to permit a careful and accurate diagnosis of the condition and the position of the ruptured vessel. If the rupture is of intramural veins, contraction will stop it. A sterilized tampon and rest complete the treatment. If rupture is complete, the tampon is useless. The second great indication is prevention of sepsis. Drainage is produced by the tampon if that is in use, and is to be preferred to the drainage-tube which may be dangerous. Antiseptic irrigations should be limited to the vagina. Absolute indications for surgical interference are the complete liberation of the fetus into the abdomen, passage of the placenta into the abdomen, absolute pelvic contraction, head detached from the trunk in the abdominal cavity, evisceration not accomplished, narrowing of the soft parts, cervix nondilatable, rupture complicated with placenta prævia, violent external hemorrhage, and prolapsus of the intestine through the wound. In cases of incomplete or slight rupture it may be possible to suture the wound. This is especially applicable when the peritoneal cavity has not been entered. If the laceration has been severe and large, laparotomy is indicated. Vaginal hysterectomy is contraindicated when the wound is large, when the intestine is prolapsed, when the condition is complicated with rupture of other organs, and when large hematomata are present in the parametrium. Here the abdominal operation is to be preferred. If the uterus is much lacerated or there is cicatricial tissue present, it becomes necessary to amputate the uterus, leaving the cervix. In severe cases, total abdominal hysterectomy is the operation of choice.

Irrigation Treatment of Puerperal Sepsis.—Considering other methods of treatment ineffectual, Henry Weil (*N. Y. Med. Jour.*, June 19, 1909) has employed irrigation in eight cases, six of which terminated in pelvic abscess and were then treated by incision and drainage. The treatment is merely intrauterine irrigations given with sufficient frequency to keep the uterine cavity empty of all lochia. With the patient in the dorsal position on a bed or table, two soft rubber tubes are inserted into the uterus, one well up to the fundus, the other beyond the internal os. The tubes are held in place by a light vaginal pack. Both tubes project a few inches beyond the vulva. To irrigate, a fountain syringe is coupled to the longer tube, the other tube merely providing for a return flow. In this manner the irrigations are readily given on a bed pan or Kelly pad, and no particular skill is required. The frequency of irrigations is of much importance, and it is better to err on the side of too many. They must be given both day and night. In the more severe cases, continuous irrigation from the start is advisable. With milder cases, hourly or even two-hourly irrigations should suffice. When no improvement is evident, the irrigations should be increased if necessary to the limit, and once benefits are manifest they may be cautiously reduced. The solution used is perhaps of little consequence. Plain salt solution is as good as any. Above all, the solution must be sterile and the whole procedure carried out with due regard for asepsis, using one-half gallon of solution at each irrigation at body temperature.

GYNECOLOGY AND ABDOMINAL SURGERY.

Submucous Perineorrhaphy.—W. W. Babcock (*Jour. Amer. Med. Ass'n*, May 15, 1909) describes a method of perineorrhaphy which he has satisfactorily employed for six years. The operation is based on the following principles: First, no tissue is removed or extensive denudation made. Second, buried, absorbable, layer sutures are used exclusively, none of which penetrates the skin or mucous membrane. Third, the operation is done from the outside of the vagina, rendering the introduction of sutures easier and the exposure of tissues better than with those operations done from within the vagina. Fourth, each structure is sutured with precision under the guidance of the eye. Fifth, each of the layers of the perineal floor—vaginal wall, submucosa, muscular supports, fascial planes, and skin—are united *seriatim* in layers. Sixth, the vagina is not separated from the rectum and therefore there is no danger of wounding the bowel. The operation restores and increases the length of the vagina instead of shortening the posterior wall of the vagina as occurs with many of the older operations. The sharp point of a pair of scissors is introduced into the subcutaneous cellular tissue just external to the orifice of Bartholin's gland. The incision is carried around the posterior margin of the introitus just external to the carunculæ until a point external to the orifice of the opposite Bartholin's gland is reached. If the posterior wall of the vagina is bound down and deformed by cicatricial tissue, this should be loosened sufficiently to overcome the deformity. The edge of the levator ani muscle is located between one finger placed against the lateral wall of the vagina, and a second finger or thumb placed in one side of the wound. A pair of sharp-pointed scissors is thrust through the depths of the wound to the situation of the anterior edge of the muscle, then opened and withdrawn. The opening is enlarged by stretching with the fingers or, if necessary, by a few touches of the knife, and the finger is passed into the opening close to the lateral vaginal wall until the edge of the levator ani is felt. The muscle is freed on its inner and outer sides by the finger, grasped with a pair of tenaculum forceps, and pulled into the wound. The opposite edge of the levator ani is then exposed and brought into the wound in the same manner. With a curved needle and No. 1 plain catgut the mucous membrane is united, beginning near what was the posterior commissure. A continuous suture is used, engaging the submucous cellular tissue a short distance from the wound edges and uniting the upper border of what was a transverse incision in a vertical manner. Suture number one which has thus made a partial submucous closure of the vaginal wall is then temporarily laid to one side to be finished later. To unite in the median line the edges of the levator ani muscle, interrupted, continuous, or mattress sutures of chromic catgut may be employed, but the muscle must not be united so far anteriorly as unduly to constrict the orifice. Some of these sutures catch the underlying submucous tissue to prevent the formation of a dead space. Posteriorly, a simple or figure-of-eight suture is employed. In certain cases, it may be desirable to reinforce the sphincter ani by splitting off strips from the anterior edges of the levator ani, wrapping these about the sphincter and fixing them in place by sutures. The outer edges of the incision through which the levator ani muscles have been brought are united in the median line by continuous, interrupted, mattress or imbricating sutures of No. 1 chromic catgut, as may seem necessary in the particular case. To obliterate any dead space some of the sutures may catch the underlying muscle. Suture number one, which completed the submucous union of the vagina, is continued posteriorly under the skin, uniting the subcutaneous and Colles' fascia until the posterior portion of the incision is reached. The two ends of suture number one are then tried. All sutures being buried and the layers bound together compactly, there are practically no dead spaces.

Medical Treatment of Pelvic Affections.—L. G. Richelot (*La Gyn.*, May, 1909) believes that not all gynecological troubles necessitate operation, and that hot water should play an important part in their treatment. But in order to be effective the hot-water douche must be much more prolonged that is generally used, six to ten liters being employed at a temperature of 50 ° C., with a double-current cannula, so that the external tissues are protected and the water can be used very hot. There are two great indications for this treatment; it is effective in nongonorrheal infections, propagated to the adnexa and the peritoneum from the uterus, for example, in salpingitis extending slowly and without large tumor, and prevents suppurations in subacute cases. It is also useful in so-called arthritics. The author describes a series of cases.

Value of Kinesotherapy in Uterine Hemorrhage.—Gaston Bloch (*Jour. de Méd. de Paris*, June 5, 1909) lauds kinesotherapy in the treatment of all sorts of uterine hemorrhages, and gives several examples of its value. It regularizes the menses, diminishes their duration and the frequency of appearance. All menstrual troubles, all uterine hemorrhages, from the simplest troubles to symptomatic hemorrhages of fibroma, salpingitis, retrodeviations, and metritis, are benefited by it. It includes massage and gymnastics. The massage consists of circular movements over the abdominal wall. The gymnastic movements are for the purpose of lessening congestion of the pelvic organs, by movements of the femoral abductors, given three times a day. The movements must be executed with great care not to fatigue the patient, and should be done under the direction of the physician himself. The action is mechanical and causes reflex action at a distance, reacting on the circulation. Circular movements exerted over the intestines cause vasomotor alterations, and increase the activity of the circulation. The vessels are hemiparetic in hemorrhagic pelvic conditions, and these movements tone them up to a normal action. The abductor movements crowd back the blood from the engorged territory into the other veins. Among the most valuable means of treatment for arresting uteroadnexal hemorrhage is kinesotherapy. It allows the patients to continue their ordinary occupations, and is absolutely harmless. It should be used carefully and gently and not prolonged. It is most valuable to regulate the menses.

Lumbar Anesthesia with Novocain in Gynecology. H. Sieber (*Münch. med. Woch.*, March 9, 1909). His results with novocain in lumbar anesthesia have been excellent. He analyses the last two hundred operations with lumbar anesthesia at the Woman's Hospital at Marburg. Of these there were 4.5 per cent. of failures, and 6.5 per cent. of not entirely satisfactory anesthesias. In eighty-three cases scopolamin-morphine narcosis was used. For the rest novocain-suprarenin solution was used. In six cases narcosis with ether had to be induced and in three chloroform was administered. There were fifty-eight laparotomies, forty total extirpations, and 102 other operations, for the most part vaginofixations, operations for prolapsus and fistula and perineal repair. The dose of 2.5 c.c. of 5 per cent. solution was too small to give the best results. The results with scopolamin-morphine were more unsatisfactory than with novocain. Of the bad symptoms obtained by other operators the most important are nausea and vomiting. In the author's series retching occurred only eight times, four of which were laparotomies and two vaginofixations. Vomiting occurred in three laparotomies; but this symptom often occurs in laparotomy under any form of anesthesia, and the symptom is not at all peculiar to novocain anesthesia. Headache was not frequent; meningismus was never observed. Weakness of muscles, especially of the eyes, is found in other forms of anesthesia as often as with this form. Of the eighty-three cases in the first series, there was increase of pulse rate in twenty-six; in the 117 cases of the second series, with novocain, there were none at all. In the series with scopolamin-morphine there were increase of pulse and temperature up to the third day in eight cases. The author believes that scopolamin affects the heart and has no doubt that its combination with morphine, chloroform, and ether increases its poisonous qualities. In lumbar anesthesia with novocain, 1 cg. of morphine is given hypodermically twenty minutes before the injection. Puncture is made between the second and fourth lumbar interspaces, as little fluid as possible being allowed to escape, since lowering of the pressure increases headache. Anesthesia occurs very rapidly.

Electricity in Gynecology.—A. Zimmern (*Ann. de Gyn.*, June, 1909) states that although electricity is far from being a panacea in gynecology, it has its valuable place in the physician's armamentarium. The two forms of electricity that are of value are galvanism and the high tension current. The author describes the form of apparatus to be used. The properties of electricity that are of value in gynecology are the chemical and motor properties. The power of electrolysis is utilized to stop hemorrhage by means of the negative pole of the galvanic current. Placed in contact with sclerotic or cicatricial tissue, the consistency of the latter is modified, and it is softened and rendered elastic. This is of value in treating strictures of various organs. The action of the acids developed at the positive pole are used with platinum, nickel, and carbon electrodes. If metallic electrodes are used, one obtains the effect of the decomposed metals, zinc, silver, and copper, on the tissues. In this manner we get the effects of an interrupted current, which gives motor effects on the tissues. In unstriped muscular tissue there is a slow contraction which lasts for some time after the application. Currents of high frequency are used to modify local circulation, as a decongestive, and to cause active repair of wounds. The electric currents are used in functional and organic troubles

Of functional troubles, amenorrhea is most affected in infantile uterus and in nervous amenorrhea. Nervous dysmenorrhea is also benefited by galvanism, the action of the negative pole being to render the tissues elastic. Its simplicity and lack of danger render it an excellent method of treatment here. Of organic troubles the treatment of fibromata by the Apostoli method is justifiable when we have inoperable fibroids which cause severe hemorrhage and pressure symptoms. The action is entirely palliative. The author's theory of its action in these cases is that the current acts on the excitomotor elements of the uterus, the action of which has been inhibited by disease. Metritis of the true chronic variety gives very good results under this treatment. We may use intrauterine electrolysis with electrodes that are not attacked by the acids, or electric introduction of ions in the form of interstitial electrolysis. The action on the muscular apparatus plays an important part in this treatment. When metritis is complicated with menorrhagia and metrorrhagia, positive electrolysis is employed, as in the majority of cases of corporeal metritis. In old fungous metritis one uses carbon electrodes or zinc electrolysis. With simple menorrhagia with atonic muscle the excitomotor effects are derived. When leucorrhea is the principal symptom we use silver electrolysis with the negative pole. This is particularly effective in gonorrheal metritis. In simple subinvolution the excitomotor current is employed. In the form of fulguration and x-rays, electricity is of little real value in malignant neoplasms. But fulguration has a specific effect on the cicatrization of wounds, and it is of great value in causing healing or extensive wounds made by cancer operations.

Malignant Tumors of the Great Omentum. L. Litchkous (*Ann. d. Gyn.*, June, 1909) says that tumors of the great omentum are somewhat rare. They consist of lipomata, sarcomata, carcinomata, lymphangiomata, dermoid cysts, collections of blood and serum, and more frequently hydatid cysts. After giving a short account of the cases reported in medical literature, the author describes one observed by himself, a true primary sarcoma of the omentum with metastases in the peritoneum. The symptoms of tumor of the great omentum are not characteristic of this form of growth and the differential diagnosis is rather difficult. They are superficially situated in the umbilical region, are little displaced by movements of respiration, and transmit the aortic pulsation. They cannot be displaced downward at all, although they can be moved somewhat laterally and upward. They produce no symptoms appreciable by the patient until they are large enough to cause pressure symptoms, and death occurs by cachexia, since no vital structure is attacked. They may be confounded with ovarian tumors. Tumors of the mesentery are more often accompanied by painful crises than those of the omentum. The presence of fluid in the abdominal cavity is in favor of a tumor of the omentum rather than of the mesentery.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

DERMATITIS EXFOLIATIVA NEONATORUM.*

BY
HANNAH G. MYRICK, M. D.,
Member of Massachusetts Medical Society and New England Hospital Medical Society;
Attending Physician to the New England Hospital for Women and Children.
Boston.

(With five illustrations.)

DURING February and March, 1909, there occurred in the New England Hospital for Women and Children eight cases of exfoliative dermatitis corresponding very closely to that known as dermatitis exfoliativa neonatorum, or Ritter's disease.

The earliest description of this disease was given by Ritter von Rittershain in 1878.(1) During the years 1868 to 1878 Ritter observed 297 cases; of these 150 children recovered, 145 died, and two remained under observation at the time of writing. Boys were more susceptible to the disease than girls and more of them succumbed. The cases occurred from the second to the fifth week of life.

Ritter's original description of the disease can be recognized in nearly all the subsequent articles that have appeared on the subject. He describes a prodromal stage in most cases, consisting of a dryness of the skin with a furfuraceous exfoliation associated with the physiological desquamation of the new-born. The actual onset of the disease is manifested by a slight redness about the mouth, not sharply defined, and rapidly increasing in intensity. Rhagades form at the angles of the mouth. On the mucous membrane of the palate may be seen miliary plaques, irregular in form, often confluent and covered with a grayish-white exudate. From the region of the mouth the swelling and redness of the epidermis spreads over the entire surface of the body, while the part first affected is covered with crusts which present cracks and fissures, and give to the lower portion of the face the appearance of a red and yellow coat of mail. Even at this stage nursing is not interfered with.

*Read at a meeting of the New England Hospital Medical Society, May, 1909.

While these changes take place in the lower part of the face the process advances in other areas of the skin. The epidermis is more or less thickened and raised up from the cutis, and thrown into folds which are either spontaneously thrown off or may be easily lifted up from the cutis in great flakes. In this way exfoliation of the entire body occurs, giving an appearance as if the child had been scalded. The cutis is dark red, in some places moist, in others covered with thin yellow crusts. Regeneration may occur rapidly and in seven to ten days the epidermis may be nearly or quite normal in appearance.

Ritter calls attention to the fact that eczema may develop on the regenerated skin, and as sequelæ there may be also furuncles, abscess of the cellular tissue, areas of local inflammation, and sometimes phlegmonous infiltration which may lead to gangrene. Pneumonia and diarrhea are occasional sequelæ. He claims that relapses are rare and always milder than the original attack.

The foregoing is a fairly literal translation of the descriptive portion of Ritter's article.

From the time this article appeared in 1878 to the present day there has been much diversity of opinion as to the exact nature of the disease, the chief point of dispute being its relation to Pemphigus.

Pusey,(2) in his Principles and Practice of Dermatology, says: "It has been regarded in turn as pemphigus foliaceous (Behrend), as an exaggeration of the physiological exfoliation of the newborn (Kaposi), and as epidermolysis (Caspary)."

Ritter claims that it is a distinct disease, and distinguishes it from pemphigus by the erythema accompanying the dermatitis, the thickening of the cast-off epidermis and the changes in the cutis; also by the absence of the characteristic margins of the pemphigus blebs. He regards it as a pyemic process, and thinks the disease is one of the varied forms of pyemic infection of the new-born and sucklings; also that it has something in common with other localization of pyemic processes in puerperal women.

Kaposi,(3) in his book on Pathology and Treatment of Diseases of the Skin, 1905, says: "I agree with Von Ritter that the affection is different from Pemphigus foliaceous, while I do not believe that it is a pyemic process, I regard it as an exaggeration of the physiological exfoliation of the epidermis in infants." Kaposi describes three grades of the disease; in the mildest grade there is diffuse redness of the general integument with fine desquamation of the epidermis, more marked on the face and joint flexures. It gives rise to rhagades at the angles of the mouth, eyes, and nares. His second and third grades differ in no way from Ritter's description.

Patek,(4) n the Journal of Cutaneous Diseases, 1904, gives a good and full description of the disease, with a report of one case; he distinguishes it from pemphigus foliaceous and claims that its clinical history surely justifies its being considered septicopyemic in orig n.

Dorland,(5) in an article published in 1896, gives a theory I have not found elsewhere; he reports one case occurring on the seventh day of life and running an uncomplicated course. When the mother was at the end of the seventh month of pregnancy her youngest child developed a mild attack of scarlatina which ran an uneventful course and was followed by the usual amount of desquamation. No untoward symptoms were manifested by the mother nor did she notice any unusual fetal manifestations. Referring to this, the author says; "This case is especially interesting as substantiating the theory that the disease in question is a sequence of some form of intrauterine exanthem. It is believed that the fetus has been the subject of one of the exanthemata in a mild form, the cutaneous lesion of the disease only manifesting itself some days after birth. The fact that another child in the family had suffered from scarlatina during the latter months of gestation, and the well-recognized predisposition of the fetus *in utero* to acquire the zymotic diseases, are at least strong reasons for believing that there was in this instance an association between the two diseases."

However plausible this theory may have seemed to the writer, it certainly fails to apply in cases where the disease is epidemic in hospitals.

Edgar,(6) in his Practice of Obstetrics, gives the following definition: "An exfoliative process in the skin of the new-born which is believed to bear the same relation to pemphigus neonatorum that exfoliative pemphigus bears to common pemphigus in adult life." Under Etiology he states that the disease is believed to be due entirely to septic infection of the child from the maternal passages (from midwives, etc.).

Elliott,(7) in a most able article published in 1888, gives the following points in distinguishing it from pemphigus: "From the facts just given, it is evident that in pemphigus the bullæ are the essential features of the disease, whereas, it has already been shown that in the dermatitis of Ritter they are only secondary and not a necessary factor; the extension of the latter over the surface is, moreover, independent of the bullæ, in the former dependent upon their development; and, in addition, the bullæ of Ritter's disease are irregular in shape, not clearly defined or limited, nor separated from each other by intervening portions of healthy skin."

Jacobi,(8) in his Atlas of Dermachromes, makes no mention of Ritter's disease; he gives but a few lines to pemphigus neonatorum and does not allude to the exfoliative form of the disease. He does not consider pemphigus neonatorum a real form of pemphigus. The plate illustrating pemphigus foliaceous in the adult at first sight suggests Ritter's disease, but there are more areas of healthy skin separating well-defined lesions.

Luithlen(9) in 1899 reported a few cases of dermatitis exfoliativa, in the Archiv. für Dermatologie und Syphilis. In this article he dwells particularly on the points of distinction between Ritter's disease and pemphigus; among other things in pemphigus there is no erythema, the beginning of the disease has no seat of predilection (as the chin and mouth region in Ritter's disease), the blebs appear on normal skin and are sharply defined. If blebs form in Ritter's disease they are situated on characteristically altered skin, are irregular, not sharply defined, and often contain very little fluid.

My purpose in presenting this paper is to show how Ritter's disease, while distinct from the exfoliative type of pemphigus, is a pyemic process, due probably to the same organism as pemphigus, staphylococcus aureus, and to point out the necessity for strict and absolute isolation in the mildest case of pemphigus occurring in a maternity hospital. To this end in studying the epidemic here reported I have compared not only the cases of the disease reported by the various authors above quoted, but also the descriptions of cases in epidemics of true pemphigus reported by several authorities.

E. L. Call(10) in an article on Pemphigus Neonatorum, published in 1904, speaking of the malignant form of the disease, says: "The most extensive report of these severe cases is found in the Archiv. für Kinderheilkunde, 1900, reported by Prof. Bloch. A series of about twenty cases were observed by him in a foundling hospital. All were fatal. Some writers refuse to class these cases as pemphigus, and consider them as 'dermatitis exfoli ativa.' In support of the opinion that these are really a severe form of pemphigus, Prof. Bloch states that large numbers of the milder form of undoubted pemphigus occurred in the hospital at the same time."

Schwartz(11) in 1908 describes an epidemic of pemphigus neonatorum comprising twenty-seven cases. Under diagnosis he says: "The lesions were solely vesicular or bullous; there was no tendency to ring-like configuration, the eruption appeared first and was always most abundant around the axillæ and groins; the skin surrounding the bullæ was not erythematous."

No case among the twenty-seven resembled those of Ritter's disease in the present series, but the plates are very similar-looking, except for more healthy skin between the ruptured blebs and a more moist appearance.

Shukowsky,(12) of St. Petersburg, published in 1908 an article on Pemphigus Neonatorum Acutus. He has seen several epidemics, but none of the cases he describes resemble those here reported.

Leiner,(13) in an article entitled "Ueber Erythrodermia desquamativa, eine eigenartige universelle Dermatose der Brustkinder," describes a disease similar to Ritter's but occurring in children a little older, more chronic in its course, and of a seborrheic nature. He claims that many of the cases in the literature described as Ritter's disease, correspond more to those which he reports. He considers Ritter's disease the severest form of pemphigus contagiosus neonatorum. His description of it is taken verbatim from Ritter's original article. The erythrodermia desquamativa which he reports he attributes to autointoxication from intestinal disturbance, though he states that the etiology is not definitely determined.

Spencer,(14) of Sydney, New South Wales, described in 1899 a disease which he called dermatitis exfoliativa multiformis. This was a highly contagious affection of the new-born accompanied by exfoliation of the skin. There was no definite initial lesion, the disease beginning as an erythema, macule, papule, vesicle, bulla, or pustule. He compares the disease with Ritter's, but considers it a different infection.

Bacteriology.—The organism most commonly found is the staphylococcus aureus. Riehl alone claims the discovery of a fungus which he concludes is the cause.

Patek in his case found in the smears from vesicles multinucleated cells containing diplococci, which in their grouping and morphology closely resembled gonococci. Some of the cocci were very minute and free in the plasma. Cultures showed diplococci, for the most part very small, but a few larger ones.

The most extensive report of the pathological study is given by Winternitz in his paper entitled "Ein Beitrag zur Kenntnis der Dermatitis Exfoliativa Neonatorum" (Ritter). He had two cases of the disease and the use of anatomical material from a third case after death.

Cultures from the blood in a case where there was elevation of temperature gave the staphylococcus aureus and albus, but experiments in dogs were negative with the staphylococcus albus and positive with staphylococcus aureus, which was recovered in pure culture from an abscess. Precautions were taken to thoroughly disinfect the skin before procuring the blood. Sections of the skin showed organisms corresponding in size, form, and staining properties to staphylococci. The author recognizes that his material was insufficient for any definite conclusion to be drawn, and also that it is questionable whether the organisms found in the blood were the cause of the disease, or whether the staphylococci entered the blood from the skin during the process of the disease.

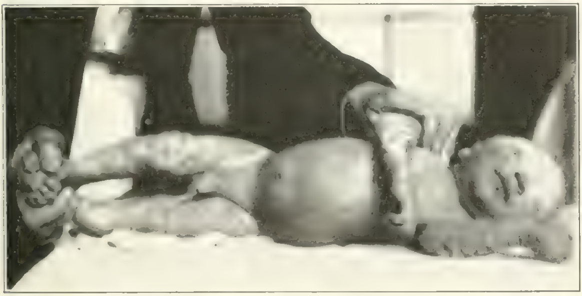

FIG. 1. Case I. Healing areas on forehead, arms, abdomen, and legs.

In the epidemic here reported cultures were taken from the pemphigus blebs from the secretion in the eyes, and from the affected skin in the cases of Ritter's disease; all showed the staphylococcus aureus.

CASE I. Baby W., colored, male, weight at birth 3,250 grams. Born February 13. History uneventful until the seventh day of life when the skin about the mouth and chin became inflamed and rough. Three days later crusts formed on these areas, and the inflammation was extending rapidly.

On February 24, the child was transferred to another building. At this time the whole face and body were involved; much of the epidermis was already lost; the forehead was scaling and crusted; eyes swollen and looked sore. Over chest and back the dermis was exposed over large areas from the exfoliation of the epidermis. The following day the epidermis of the hands was exfoliated. The legs were affected last of all. Even at the height of the disease the child nursed well and gained in weight. The temperature remained normal. Regeneration of the epidermis took place fairly rapidly. Fig. 1, from a photograph taken on March 7, shows healing areas on forehead, forearms, abdomen, and legs. The lower part of the face is entirely healed. The child was discharged a few days later, the skin normal in appearance except for some scales remaining over the forehead and scalp.

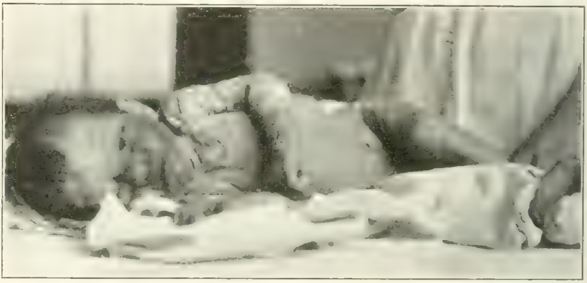

Fig. 2.—Case II. Healing area on forehead. Denuded areas on arm, forearm, and chest, showing highly inflamed cutis.

Case II.—Baby J. Born February 17, female, white, weight 3,200 grams. Normal delivery. History unimportant for first week. On February 24, the eighth day, the following note appears in the history: baby seems in good condition except that the face is chapped.

February 26.—Face is quite chafed, especially the chin and around the mouth.

March 1.—Crusts have formed on chin and around the mouth, and the whole face is reddened. Baby nurses well and has gained 100 grams in last two days. Eyes are a little reddened, but there is no secretion.

March 2.—There is considerable secretion in the eyes, but the conjunctivæ are not inflamed.

March 3.—The forehead is covered with tiny blisters.

March 4.—The face looks better, but in the axillæ and on shoulders and forearms are large irregularly-shaped inflamed areas. The face is better, but the epidermis is off of the areas in axillæ and shoulders.

March 6.—At this time the child presented a most pitiable appearance (see Figs. 2 and 3). The mouth area first affected was nearly healed, but the forehead was covered with yellowish crusts, eyelids swollen, the entire skin highly inflamed, the epidermis exfoliated in sheets from the arms, chest, upper back, neck, and under the chin. The intensely hyperemic cutis was fissured, and exuded a watery secretion. The child appeared very ill and toward night refused its feeding. The secretion which earlier in the day was profuse enough to saturate the clothing, ceased toward night, leaving the denuded areas quite dry. Early the next morning the child began vomiting, first green, then bright yellow fluid. This poured from the mouth and nose at frequent intervals during the morning and the child expired about noon.* The accompanying photographs were taken shortly before death. Autopsy was not permitted.

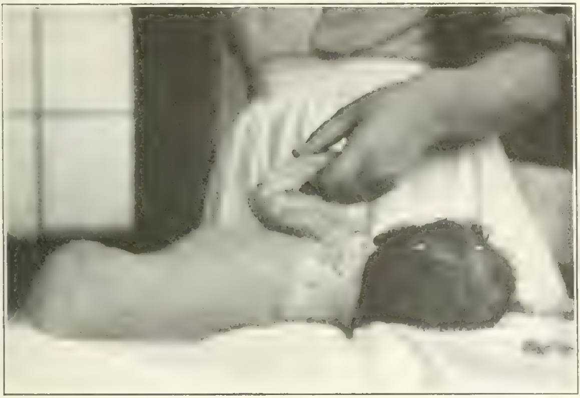

FIG. 2.—Case II. Denuded areas on shoulder, arm and back.

CASE III. Baby McG. White. Born February 26. Male, weight 3 450 grams. Delivery normal. On March 3 there was considerable nasal secretion, but condition otherwise satisfactory. On March 6, the ninth day of life, the face was quite chafed around the mouth and chin, but the baby nursed well and its general condition was good. Three days later, March 9, the whole face looked chapped, and crusts were forming on the skin. During the next few days the whole face became intensely red and covered with crusts. On March 17, an injection was given of vaccine containing 25,000,000 of the staphylococcus aureus.

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*The twelfth day from the first appearance of the disease.

The temperature remained normal and the child nursed well. (This case was not followed to complete recovery as the mother was anxious to return home as soon as improvement began.)

CASE IV.—Baby W. White. Born March 1. Male, weight 2,900 grams. Normal delivery. On March 6, the sixth day of life, the face became red, and chafed-looking; the condition rapidly grew worse, and by March 11 had extended over the entire body, but the child was still able to nurse and its general condition was good. The eyes were swollen and contained secretion, and were kept closed most of the time. The appearance of the child by March 15 (nine days from the onset) was pitiable in the extreme; the face still swollen and intensely inflamed, with beginning exfoliation of the epidermis, crusts, etc. On March 17, the child vomited several times, and the following day barley-water alone was retained. At this time exfoliation had begun over the body and the child was very ill and listless. The temperature was normal. An injection of staphylococcus aureus vaccine was given, but the following day the mother took the child from the hospital.

CASE V.—Baby C. White. Born March 5. Male, weight 2,855 grams. Normal delivery. Child was rather feeble and ran a slight temperature on the third, fourth, and fifth days of life. On March 17, the twelfth day of life, the chin and left cheek appeared chafed, the condition rapidly grew worse, the inflammation spread over the entire face, a large area appeared on the back of the neck and one around the umbilicus. There was no formation of blebs as in pemphigus, the lesions appearing always as a reddening and roughening of the skin as if chapped. By March 21 crusts had formed on the chin and cheeks. Convalescence was rapid in this case, and by March 25 the skin was almost entirely clear. There was no rise of temperature during the disease.

CASE VI.—Baby McM. White. Born March 2. Male, weight 2,980 grams. Normal delivery. On March 16, the fourteenth day of life, the skin about the mouth became chapped and inflamed, and there was some secretion in the left eye. The inflammation increased in intensity and spread over the face, back of neck and appeared also in the folds of the groin. By March 18, crusts had formed on the face. The following day the mother took the child from the hospital against advice. There was no elevation of temperature during the attack.

CASE VII.—Baby M. White. Born March 16. Male, weight 3,440 grams. Delivery normal. On March 23, eighth day of life, the chin became quite red and chafed looking. Two days later a small pemphigus bleb appeared on the abdomen. On March 27, the whole face was very red and exfoliation occurred on the chin and forehead. The skin of the entire body was markedly hyperemic and several small pemphigus blebs were seen on the abdomen. This is the only case where the two diseases were present at the same time, though there were cases of pemphigus in the house as will be shown later. At this time, March 27, an injection was given of the staphylococcus vaccine containing 25,000,000.

On March 28, great sheets of skin were peeling off of the body and legs, but not in the region of the pemphigus blebs, and there was no bleb formation at all in the exfoliating areas. The accompanying photographs, Figs. 4 and 5, were taken on March 29, and give a fair idea of the size of the denuded areas. The child did not seem ill, and nursed well. On March 31, the condition had improved somewhat, the face looked better, but exfoliation continued over the trunk and extremities. The new skin was quite dry and very red. A second injection of vaccine was given containing 30,000,000 organisms. A third injection of 50,000,000 was given on April 4. The condition improved rapidly, and the skin was almost entirely normal in appearance when the child was discharged on April 6. The temperature was normal except for a slight rise (101°) on April 2 and 3. Although the exfoliation in this case involved practically the entire body the infection seemed less virulent than in the foregoing cases. Whether this was due to the vaccine treatment, or whether the exciting organism had lost some of

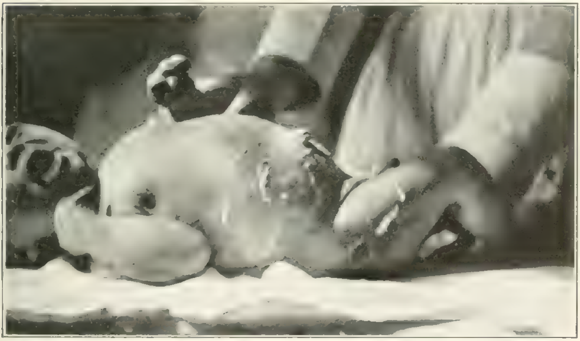

Fig. 4.—Case VII. Exfoliation of the epidermis on arm, abdomen, and thigh.

its virulence is hard to state.* The next and last case makes the latter theory the more plausible.

CASE VIII.—Baby I. White. Born March 20. Male, weight 3,800 grams. Normal delivery. On March 30, tenth day, a small red, rough area appeared on the baby's chin. This became larger and more irritated the next day, and around the nail on one finger was a slight purulent infection. On April 2 crusts formed on the chin, and this irritation spread over the face. On April 8, a small area of irritation appeared about the genitals.

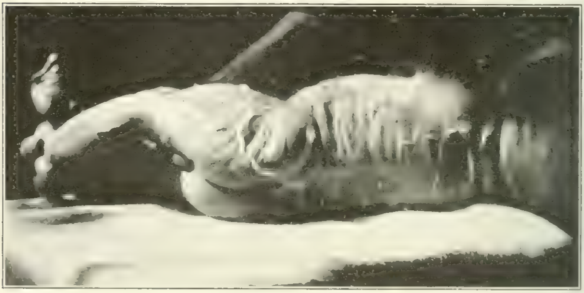

FIG. 5.—Case VII. Exfoliation of epidermis in sheets over neck, back, and thighs

The epidermis was thrown off in characteristic way from the face, forehead, scalp, and genitals, leaving the new skin smooth but very red. There was no rise of temperature, and on April 10 the child was discharged in good condition.

It will be seen that in all these cases the disease invariably began about the mouth and chin, a redness and roughening that quickly changed to an inflammation extending over the entire face and involving to a greater or less extent the trunk and extremities. On the third day crusts formed on the areas first affected. The disease ran an afebrile course, and there were no notably subnormal temperatures. Seven of the eight cases were males, illustrating well the predisposition noticed by Ritter. The proportion of males to females born during this period was twenty-nine to thirty. For the most part the infants nursed well and retained the feedings. There was no apparent itching of the skin. In every case the regenerated epidermis was smooth but intensely red, and in no case was there a return of the lesion on the new skin. The scalp was always the last area to entirely clear, as in this region a seborrheic condition succeeded the initial inflammation.

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* The subsequent history, obtained from the parents, is interesting. On April 12, six days after leaving the hospital, the child developed pneumonia. It recovered from the attack, but was more or less ailing for a few weeks, chiefly from disturbances of digestion, and died on May 18 from what was said to be "acute hydrocephalus." Pneumonia and indigestion are both acknowledged sequelae of Ritter's disease.

In Case VII several typical pemphigus blebs appeared coincidently with the outbreak of the dermatitis; these were all small, healed quickly, did not coalesce, and had disappeared entirely before the exfoliation began on the portion of the trunk where they had been situated. This is the only case in the series showing any pemphigus lesions.

All the mothers nursed their infants and throughout the epidemic there was no case of maternal infection of any sort. In the case where the mouth condition was extremely bad, a glass nipple shield was used as a safeguard for the mother. The criticism may be raised that these were not true cases of Ritter's disease inasmuch as there was a somewhat less sudden return to the normal skin condition, and also because of the low mortality.

It is generally conceded that in the dry form of the disease the process is slower than where there is extensive formation of bullæ. As to the mortality, all authors speak of it as about 50 per cent., but state further that death does not necessarily occur from the immediate effects of the dermatitis, but may follow some weeks later.* It is too soon to claim that the mortality in this epidemic was only 25 per cent.

In an attempt to trace the origin of the disease I have consulted the histories of all infants born during the months from November to April, inclusive. In tabulating the cases I have included every one in which was mentioned even a single pimple anywhere on the child's body. Such a lesion often proves to be of no importance, but the nurses are required to report on their charts the slightest departure from the normal.

During November and December there were seventy-seven births. Of these five infants were reported as having one or more "pimples," four had "pustules," three had pemphigus, two had "irritated faces," and five had "sore fingers." Two of the cases included as pemphigus were very mild, one bleb each; the third, however, was a definite case of the disease. The child was born on December 5. On December 13, a bleb the size of a dime appeared on the abdomen just below the umbilicus. On December 21, numerous blebs were present on the abdomen and thighs. This case was separated from the other infants and not weighed on the nursery scales after the first bleb appeared on December 13. It remained, however, in the maternity building until discharged on December 14. During January there were thirty-five births, among these one infant had a "pustule," three had pemphigus, and a fourth developed the disease after leaving the hospital, six had irritated faces, one had a sore finger. Two of the pemphigus cases were very mild, but the third had numerous lesions and was transferred to another building.

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* See note under Case VII.

In February there were thirty-six births; among these five infants had pustules, four had pemphigus, five had irritated faces, two had sore fingers, three had Ritter's disease, while a fourth case might be included, if we accept Kaposi's classification in three grades.

During March there were forty-nine births; of these two infants developed "pustules," five had pemphigus (one of these was a case of congenital syphilis with the eruption present at birth), four had irritated faces, four infected fingers, five had Ritter's disease, and a sixth case is questionable. During all this time the health of the mothers was excellent.

In January one case of pemphigus and in February one case of pemphigus and the first case of Ritter's disease were transferred to another building when the lesions were well pronounced. Until March, however, the infants with one or two pustules, pimples, sore fingers (paronychia), and irritated faces were not strictly isolated. The nurseries were fumigated from time to time.

In the New England Hospital the babies are kept each in its own crib, in three large sunny nurseries; these communicate with each other, and each also opens into the corridor. The bath-tub, dressing table, scales, etc., are in the middle room. At nursing hours the infants are taken to their mothers in the wards. The infants are cared for by special nurses not engaged in general ward work.

The maternity building forms three sides of a square. The nurseries and two wards, one of three and one of six beds, occupy the middle or south wing. The east wing consists of private or semiprivate (two bedded) rooms; the west wing of three bedded rooms and a convalescent ward of six beds. Patients remain in the hospital an average of twenty days.

During the first week of March, the nurseries were again fumigated, and one of the rooms taken for an isolation ward; in this room every infant presenting the slightest lesion was placed. Special nurses cared for them and they used nothing in common with the healthy infants, but at nursing hours they were carried through the corridor to their mothers, some of whom occupied rooms in common with the mothers of healthy infants.

This was a possible means of spreading infection; moreover, fresh lesions would crop out in the clean nurseries from day to day, necessitating removal of an infant to the isolation ward, so that it soon became evident that more stringent measures were necessary. The nurseries were then closed. Each infant had its crib by the mother's bed. All cases having the slightest skin infection of any nature were placed with their mothers in the west wing, and all absolutely clean cases in the east wing of the building. A separate corps of nurses was on duty day and night in the two wings. All infants developing fresh lesions in the clean wing were at once transferred, with their mothers, to the isolated wing; here all bedding, both mother's and infant's, and all the body clothing of both were separated from the common laundry and received special attention.

The scales for weighing the infants, after thorough disinfection, were placed in the confinement suite. An infant was weighed immediately after delivery, but not again, as even in the clean wing no child was taken from its mother's room for any purpose. No articles were used in common, even by the healthy babies. They were bathed with sterile oil, poured from a bottle onto pledgets of cotton, not into a dish into which the pledgets could be dipped. This strict isolation necessitated a much larger corps of nurses and the strictest of supervision, but its success can be judged when of fifty-nine infants delivered from March 31 to the date of writing, May 15, there has been not a single case of sore finger, pimple, pustule, pemphigus, or Ritter's disease. The nurseries were again opened toward the latter part of April, and all infants delivered after the date of opening were placed in them, but no infant that had been in the wards, even though perfectly healthy, was admitted to the nursery, and separate nurses were employed until the last infant had left the wards. Daily weighing was again resumed in the nurseries.

The nature of the lesions presented, the presence at the same time and previously of many cases of pemphigus, mild and moderate in grade, and also of paronychia and minor pus lesions, and the simultaneous disappearance of all pyemic processes after strict isolation was practised have led to the following conclusions:

1. Dermatitis exfoliativa neonatorum is not synonymous with pemphigus.

2. It bears a very close relation to pemphigus neonatorum and may occur during epidemics of pemphigus.

3. It is a highly contagious disease, demanding isolation when occurring in maternity hospitals.

4. The exciting organism is probably the same as that of pemphigus, the staphylococcus aureus.

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TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY.

(*Continued from August.*)

PRELIMINARY REPORT OF METABOLISM OF DIPHTHERIA.

DR. JOHN HOWLAND, New York, said that his studies of metabolism of diphtheria were undertaken with the desire to investigate what metabolic disturbances might be produced during the course of diphtheria and to throw some light upon the obscure and fatal combination of symptoms usually ascribed to pneumogastric paralysis. From the evidences that they had, there seemed reason to doubt that vomiting, abdominal pain and slow pulse were due to degeneration of the vagus. If they were due to degeneration of the vagus, they should expect to find these symptoms with the degeneration, and the nerve should be found to be normal when these symptoms were absent. But such was not the case. .The pneumogastric nerve was found to be degenerated in practically every fatal case of diphtheria. These changes were found without regard to any associated symptoms. He had found the nerve degenerated in diphtheria when there was no reason on clinical grounds to believe that it was affected. The vagus was also affected or degenerated at times when bacteriologically there were no evidences of diphtheria and no clinical reason to suspect its involvement. The slowness of the pulse, instead of its rapidity that one would expect, and the fact that bradycardia could not be prevented by doses of atropine, still further discredited pneumogastric degeneration as a causal factor.

In febrile affections there was excessive excretion of the urinary nitrogen; concerned in this were two separate factors, the pyrexia and the infectious agent. It was exceedingly difficult to separate the two, and to find pyrexia without infection, or infection without pyrexia. For this reason they were usually discussed together. There was no strict parallelism between the height of the fever and the amount of proteid destruction with its excessive nitrogen elimination. In general, however, excessive nitrogen falls with the temperature, but it might continue for several days even after the normal temperature had been reached. Attention was called first to the total nitrogen excretion in a few patients that had been studied as to intensity and duration of the excretion. It might thus be seen that during the course of diphtheria there might be a very great loss of nitrogen due to the effect of the toxemia alone, and this loss might continue far on into convalescence. It would appear, therefore, that coincident with the albuminuria there was a great destruction of body protein which took place in the muscles and parenchymatous organs and probably in the kidney itself, and the albuminuria might be only an expression of the injury done to the kidney cells by which they were rendered less efficient for a time, and allowed the serum albumin to pass through into the urine.

Kreatin was a substance found in muscle and present in the urine when kreatin was contained in the food, but when the diet was free from kreatin there should be only a trace or none at all. With the destruction of muscles that took place in fever and cachectic processes kreatin appeared in the urine. Very considerable quantities of kreatin found in the cases reported indicated that destruction of the striped muscle was in progress. So far as the undetermined and ammonia nitrogen was concerned there was nothing decidedly abnormal. Nothing had been done to make it appear that there was a marked and prolonged excretion of nitrogen evidently due to the toxemia that would have developed an albuminuria; there was evidence of great destruction of the body protein and that destruction of striped muscle took place even when the temperature was normal was shown by the excessive kreatin excretion.

ATRESIA OF THE DUODENUM.

Dr. Roland G. Freeman, New York, said that the report of this case made sixty-three that had been recorded. The cause of this condition was unknown, but among the etiological factors had been mentioned syphilis and pressure upon the head of the pancreas. The subject of this report was a male child, born of a primipara parent who went through her pregnancy without any symptoms. The child was asphyxiated at birth. Within twenty-four hours the child presented no untoward symptoms. On the second day, after nursing, it was noted that no urine was passed and the baby vomited fluid matter of a dark green color. On the third day there was no vomiting. Mucus was passed by the bowels and the child was jaundiced. The patient was fed with breast-milk as well as a modification of cow's milk. On the fifth day the vomiting continued and the jaundice was marked. The stomach was then washed out. On the sixth day the child did not seem to be fit for operation and on the eighth day it did fairly well. On the ninth day, however, the child grew decidedly worse and on the tenth day, died. The temperature had never been above 99.

At autopsy there was found a small stricture or constriction and the esophagus was dilated above that stricture. The duodenum near that constriction was bound by adhesions. The walls of the stomach were thickened. The stenosis of the esophagus was complete, and surrounding it was connective tissue.

A SPECIMEN OF FORMED MECONIUM SIMULATING INTESTINE.

Dr. Freeman said that one year ago he was called in consultation to see a baby with what was supposed to be a protrusion of the bowel from the anus; the protruded part had turned black. Otherwise the child was in very good condition, being a robust baby. Dr. Freeman found a cylindrical coil one-half inch thick and eight inches long protruding from the anus. It was dark greenish in color, which was characteristic of meconium. With gentle manipulation he separated this coil and found it to be meconium.

Dr. Rotch said that congenital strictures of the duodenum were fairly rare, but that cases occurring in young children or babies with symptoms of stricture of the duodenum were not so very rare. It was very important that a diagnosis should be made of pyloric obstruction and stenosis of the duodenum and volvulus and twist of the intestine. Many of these cases could be saved if a diagnosis had been made. Dr. Rotch had had cases of twisting of the omentum twice on its axis, where operative procedure had relieved it. He believed strongly in operative measures in children, but a great point was in making a correct diagnosis.

CONGENITAL MALARIA.

Dr. Frank S. Meara, New York, read a paper which dealt with cases of so-called congenital malaria, and the question arose whether there was such a thing. He reported the case of a child, born in the fall on Long Island. There had been a cold winter. The child was apparently healthy at birth. On the tenth day he became sick and was brought to the wards of Bellevue Hospital with what was supposed to be a hernia. This hernia proved to be a spleen, which filled one-half the abdominal cavity. An examination of the blood of this child showed a tremendous number of parasites. The mother's blood showed the same. The child died. Dr. Meara believed that such a child was either affected in the ordinary way, or else was inoculated by the maternal blood in the act of parturition. It was fair to assume the possibility of separation of the placental membranes with inoculation following. We believed that this was a case of congenital malaria occurring during the act of parturition.

THE SO-CALLED THYMUS DEATH, WITH AN ACCOUNT OF SEVEN CASES OF SUDDEN DEATH IN ONE FAMILY.

Dr. J. P. Crozer Griffith, Philadelphia, said that in April, 1907, he had been called in consultation to see a child who was three months of age and who only had a bronchitis at that time. It was the seventh child in the family, was well nourished, but on account of the fate of the other children, the parents dreaded what might happen. The child was breast-fed for three weeks and then was weaned gradually. When three months of age a diagnosis of a mild bronchitis was made. The possibility of status lymphaticus was considered. Soon the lips and extremities became livid and there appeared harsh respirations on both sides of the chest. The dyspnea continued and the child soon died. The thymus gland was enlarged, weighing 27 grams. There was hypostatic congestion of both lungs. The heart was large, but without valvular lesions. The bronchial, mesenteric glands and spleen were enlarged.

In this family there had been eight children and all but one breast-fed, and yet only one was alive at the time of writing. The clinical histories in all the cases that died were nearly identical. The tenth child was now soon to be born and Dr. Griffith was anxious to know what possibly could be done to save it.

With regard to the cause of death there was no evidence of tracheal compression in any of them. Warthin and others claimed that the majority of these cases undoubtedly had pressure from an enlarged thymus gland. The old theory regarding status lymphaticus was practically exploded. Among the theories advanced were the following: A. *Non-mechanical.* 1. Defective secretion of the thymus with constitutional disturbances. 2. A neurosis of some sort. 3. A neurosis independent of status lymphaticus. B. *Mechanical.* 1. Pressure upon the trachea. 2. Pressure upon the cardiac nerve trunk. 3. Direct compression of the trachea with strangulation. Evidently there were two classes of cases, namely: Those due to the mechanical obstruction to respiration, and those due to nervous influences, with cardiac failure and no evidences of stenosis. Dr. Griffith gave a warning against the conclusion that an enlarged thymus in cases of sudden death had very great significance.

DR. SOUTHWORTH thought that in time these cases would be ascribed to some disturbances of the internal secretions.

DR. KOPLIK said that the tendency to-day was to group cases of status lymphaticus and tetany in the same class. The clinical symptoms of one were very closely allied to the clinical symptoms of the other.

DR. HOWLAND said that Warthin believed that as their knowledge increased, more and more cases of compression were being reported, but Dr. Howland thought this was because of the rarity of these reports. The ordinary cases of sudden death with the pathological picture of enlarged thymus were now so common that nobody reported them any more. Any child dying suddenly might have an enlarged thymus gland. It seemed to him that they must consider enlarged thymus glands and enlarged lymphatic apparatus throughout the body as a common pathological finding. There were pathological, biological and histological evidences to prove that the thymus gland was not a lymph organ.

THE STOOLS OF THE NEW-BORN AND THEIR SIGNIFICANCE.

DR. THOMAS S. SOUTHWORTH, New York, summed up the present-day teaching in a few words, as follows: that after a period varying from three to, at most, five days, the meconium gave way to yellow or orange-yellow stools, and these were of a uniform homogeneous, semi-solid consistency; that this was the normal stool, and any material departure from this classical type indicated a disturbance of digestion on the part of the infant or a deficient or unsuitable secretion of breast-milk on the part of the mother. Dr. Southworth's observation of the stools of new-born infants in the maternity wards of the Nursery and Child's Hospital, which had extended over a number of years, was not in accord with this accepted view. He presented a table showing the statistics of fifty infants successfully breast-fed. The meconium in these fifty cases lasted from two to five days, an average of three and one-half days. The color was brown in fourteen cases, appearing on the third to fifth days, with an average cessation of four and one-half days; dark green in thirty-one cases, appearing on fourth to seventh days, with an average cessation on the fourth day; yellowish-green in seven cases, appearing on fifth to eleventh days, with an average cessation on eighth day; greenish-yellow in twenty cases, appearing on fifth to twelfth days, with an average cessation on the seventh day; greenish-yellow soft residue in twenty-eight cases, appearing on fifth to eighteenth days, with an average cessation on eight and three-fourths days; yellow, soft residue in forty-six cases, appearing on the fifth to twentieth days, average establishment on nine and one-half days; yellow, soft residue, established seventh day, eighteen cases; established eighth to tenth days, fifteen cases; eleventh to fourteenth days, nine cases; over fourteen days, four cases. Yellow loose in three cases continuing until twelfth, nineteenth and thirty-fourth days, respectively. The earliest stools of the infant consisted of meconium and were of a brownish-black color. These persisted for three or four days, and were followed by bile-tinged mucoid intestinal secretion, which might be dark brown or brown-yellow, but much more commonly dark-green, depending upon whether bile pigment was in the form of bilirubin or biliverdin. About the sixth day a certain proportion might assume the classical yellow or orange-yellow color as the exception rather than the rule, but the majority are greenish-yellow, still more or less fluids, gaining gradually in consistency and only at a later period becoming yellow. The change, therefore, from meconium to the classic yellow, semi-solid stool was not an abrupt one and the color, fluidity and consistency followed no fixed rule. The importance of this variability of the stools in the newly-born lay in the prognostic and diagnostic significance which might be attached to them. Under the present teaching, the conclusions drawn were most erroneous, and in consequence, steps were often taken which had a serious bearing upon the welfare of the infant. Personally he was convinced that the larger part of these variations were physiological, pending the establishment of complete harmony between mother and child in the extrauterine phase of nutrition, and that they were by no means pathological.

Dr. Southworth offered the following conclusions: 1. The classical orange-yellow, semi-solid stools appeared in the majority of newly-born infants later than was usually stated. 2. Considerable variations in the color and consistency of the stools of newly-born infants were entirely compatible with regular gains in weight. 3. Such variations in the stools for ten days or more, even with slow, halting, or irregular gains in weight, gave no certain indication that successful breast-feeding could not be carried on. 4. Whatever the character of the stools, weaning was never indicated if the infant was gaining steadily in weight; nor with delayed gains until intelligent efforts had been made to bring mother and child into physiological accord. 5. In the dark green stools of insufficient nutrition, which were starvation stools, and not limited in their occurrence to the first few days of life, there was a practical absence of milk residue. 6. A good yellow color of the masses of milk residue, or a yellow color when they were smoothed out, precluded the assumption of indigestion, whatever the color of the exterior or of the surrounding media. 7. Delayed gains in weight were very often the result of factors which prevented the infant from securing a sufficient quantity of milk from perfectly competent breasts and with patience and ingenuity these difficulties might be overcome.

Dr. Joseph E. Winters, New York, believed that a copy of Dr. Southworth's paper should be in the hands of every nurse in the country.

THE URINE IN THE GASTROINTESTINAL DISEASES OF INFANCY.

Dr. John Lovett Morse, Boston, had had made routine examinations of the urine of 300 infants, usually but one examination being made, and all were usually examined within forty-eight hours after their entrance to the hospital. The frequency of albuminuria and renal complications were noted. It was thought that some importance might be attached to the findings of prognostic value. The classification of diseases of the gastrointestinal tract was the one adopted by the pediatric department of Harvard Medical School. Among thirty-nine cases in which the disturbances of the gastrointestinal tract were slight, there was a slight trace of albuminuria in but one case. In fifty-three cases of chronic gastric indigestion, albuminurian was present in from 2 to 4 per cent. In sixty-one cases of chronic intestinal indigestion, albuminuria was found in 11 per cent. In seventeen babies with acute gastric indigestion, albumiuria appeared in three, or 17 per cent. Of seventy babies with acute intestinal indigestion, albuminuria occurred in from 4 to 6 per cent. Of sixty-one babies with infectious diarrheas, albuminuria was found in 10 per cent. A review of his figures showed that albuminuria was found in about 8 per cent. of the babies suffering from chronic disturbances of digestion, but never more than a trace of albumin, and almost never accompanied by casts. The presence of the albuminuria had no effect upon the prognosis. Albuminuria was more common in the acute than in the chronic cases of gastrointestinal diseases of infancy. The presence of albuminuria had no effect on the prognosis in the acute gastric cases. The mortality was higher in the intestinal cases than in those without it. Vomiting was more common in babies with albuminuria. Symptoms of disturbances of the nervous system were possibly more common in those babies with albuminuria; there was nothing, however, to show any direct connection between the nervous symptoms and the presence of the albuminuria. The conclusions drawn, and which seemed to be warranted, were as follows: Albuminuria was found in from 6 to 10 per cent. of the babies ill with the various diseases of the gastrointestinal tract; albuminuria was found more often in acute than in chronic disease; judging from an examination of the sediment the pathological condition in the kidney never progessed beyond an acute degenerative nephritis; infection of the urinary tract in the symptom-complex, as in pyelitis or pyelonephritis, was not common; in chronic disease there seemed to be no relation between albuminuria and the mortality or symptomatology; the mortality was higher in acute diseases with albuminuria than when it was not present; the presence of albuminuria in an individual case did not materially modify the prognosis; edema occurring in the course of gastrointestinal diseases was not connected with the condition of the kidney; there was nothing to suggest a causal relationship between the affection of the kidneys and the nervous symptoms, the latter being due to a toxemia and not to an uremia.

THE IRRITATING EFFECTS OF CATHARTIC DRUGS ON THE INTESTINAL MUCOSA.

DR. ISAAC A. ABT, Chicago, said that this inquiry suggested itself because of the common practice of giving infants and young children cathartic drugs for a more or less protracted period, whether their use seemed indicated or not. He believed that the clinical course of some of the disorders of infancy were protracted by the excessive and untimely use of these drugs. His experience with children who were taking calomel in gastrointestinal disorders, and who suffered coincidently from severe colic, loss of weight, etc., showed that they improved when the cathartic was stopped and a rational diet was given. By his experience he hoped that he might be able to show that this group of drugs had therapeutic limitation, and that the so-called cleaning-out process should not be continued after catharsis had been established. Cathartic drugs were administered about 125 times to twenty-two children to determine the irritating effects of the average dose of the commonly employed cathartics, as calomel, castor oil, and Epsom salts. The stools were examined before the administration of the cathartic was begun. After the cathartic had been administered in varying doses for twenty-four hours, the stools were examined in the usual manner for color, odor, consistency, reactions, microscopical findings, and the degree of oxidation and bile pigment. In his resumé, the following was offered: 1. Calomel was given to eight children, sixty stools being examined. 2. The children who received one grain of calomel either in single or divided doses showed irritative effects on the following days as evidenced by the presence of mucus and occasionally of blood. 3. Those who received from two to three grains of calomel at one dose showed both blood and mucus on the following day; this often persisted two or three days after the discontinuance of the cathartic. 4. In those cases where calomel was given in divided doses (one-tenth per dose) for a period of a protracted number of days the reaction for mucus and blood increased in intensity from day to day. 5. Magnesium sulphate was given to five children and eighteen stools were examined. A small single dose of one dram of the laxative produced a slight irritation, *i.e.*, a small quantity of mucus and blood. 6. Large doses of magnesium sulphate (dram one for three successive doses) showed at the conclusion of the third day a reaction for blood by the benzidene test, and considerable mucus, but not as much as was produced by repeated doses of calomel. 7. Castor oil was given to nine children, twenty-six stools being examined. Single dram doses of castor oil produced no irritation, except a slight irritation in one case. Two drams given at one dose to older children caused a reaction and irritation in but one case; the other cases showed no irritation in the stools. 8. Castor oil was given to two children in dram doses for three successive nights; both of their stools showed reactions and irritation after the third day. 9. All three cathartics under observation were employed and were capable of producing signs of irritation if the doses were sufficiently large or if they were given for a protracted time. Of the three drugs under observation calomel seemed capable of producing the greatest irritation with the average dose in the shortest possible time; castor oil seemed to cause the least reaction.

THE MORE FREQUENT USE OF GAVAGE IN PEDIATRIC PRACTICE.

DR. E. W. SAUNDERS, St. Louis, read this paper in which he stated that gavage should be used much more often than it had been and with advantage.

SOY BEANS IN INFANT FEEDING: PRELIMINARY REPORT.

DR. JOHN RUHRAH, Baltimore, said that the soy bean (glycine hispida) was an annual leguminous plant that ordinarily grew in a wild state from Cochin China to the south of Japan and to Java. It had been known for many years in the United States. The plant was grown in America and was used chiefly for the purpose of forage crop. The full account of the plant might be found in *Farmer's Bulletin*, No. 58, and the United States Department of Agriculture, and the different varieties of Plant Industry, *Bulletin* No. 98. As regards the use of the soy beans in infant-feeding it contained a minimum of starch, and it seemed to him that the soy bean gruel, either alone or mixed with cow's milk, might be of value in infants suffering from a certain class of diseases, viz., marasmus and malnutrition, or as a substitute for milk in diarrheas, and in intestinal, and stomach disorders and in diabetes mellitus. He said he had not used it in a sufficient number of cases, nor over a sufficient period of time to justify any further statement, but he felt that if properly used the soy bean would be a valuable addition to the dietary of the sick infant. Grinding them, making a bean meal, would simplify matters very much, and if success attended their use the soy bean meal could be easily prepared. This was merely a preliminary report.

CONGENITAL CYST OF THE LIVER, WITH REPORT OF A CASE.

Dr. Henry L. K. Shaw, Albany, reported this case. He said that an exhaustive review of the nonparasitic cysts of the liver was made by Moschcowitz in 1906, and he was able to find only eighty-five cases; since that time three more cases had been reported, making a total of eighty-eight. Two of these occurred in the fetus, seven in the new-born, four in the first year, one eleven years old, and the remainder in adult life. By far the largest number of cases were in persons over sixty years of age. Multiple cysts were found in all the cases occurring in infants, and in every case there were malformations or abnormalities in other organs, most commonly degenerative changes in the kidneys. Dr. Shaw then reported the case of a single nonparasitic cyst of the liver of an infant with operation and histological examination—a very unusual occurrence. The child was brought to Albany last December when she was seventeen months old; she was well developed and weighed thirty-one pounds. The mother stated that she first noted the "lump" last August when it was about the size of an orange. The circumference of the head was 18 1/4 inches, of the chest 20 1/2 inches, of the abdomen just below the navel 22 inches. Examination of the heart and lungs was negative, and the lymph nodes were not enlarged. There was no jaundice. The abdomen was greatly distended, but the superficial abdominal veins were not distended; the umbilicus was depressed. No positive diagnosis was made. Sarcoma or other malignant growth of the liver or kidney seemed to be excluded. There was no ascites, nor edema, and the spleen was not enlarged. There were no evidences of syphilis. The persistent absence of jaundice would exclude fatty liver or hypertrophic cirrhosis. The possibility of cyst of the liver was not considered. An exploratory operation was deemed both advisable and justifiable, and Dr. Elting opened the abdomen. The lower part of the right lobe of the liver seemed occupied by a globular tumor which protruded downward to about the level of the navel. The tumor was punctured and about 900 c.c. of a clear yellow fluid withdrawn. The opening into the cyst cavity was enlarged, and a rubber tube and vioform protective drain introduced into the cavity. There was practically no loss of blood and no evident shock. She continued for approximately two hours in good condition, when she suddenly died. As revealed by the post-mortem there was no hemorrhage and no other definitely assignable cause for the death other than shock. A careful examination of the fluid was made, and it was found to contain a moderate amount of albumin and microscopically it showed only detritus, no cells, or formed elements of any variety were found. Moschcowitz reached the conclusion that these cysts were always associated with congenital anomalies of the liver consisting in aberrant bile ducts which might be extrahepatic or intrahepatic. The cysts had their origin in these aberrant ducts and might assume two forms: One arising from inflammatory hyperplasia of these ducts; the other, by retention of fluid in these ducts the result of congenital obstruction.

ELECTION OF OFFICERS.

President, DR. DAVID C. EDSALL, Philadelphia; *First Vice-President*, DR. D. J. MILTON MILLER, Atlantic City; *Second Vice-President*, DR. E. W. SAUNDERS, St. Louis; *Secretary*, DR. SAMUEL S. ADAMS, Washington; *Treasurer*, DR. CHARLES HUNTER DUNN, Boston; *Recorder*, DR. L. E. LA FETRA, New York. Next place of meeting, Washington, D. C., May 3, 4, and 5, 1910.

REVIEWS.

TREATMENT OF THE DISEASES OF CHILDREN. By CHARLES GILMORE KERLEY, M. D., Professor of Diseases of Children, New York Polyclinic Medical School and Hospital, etc. Second revised edition. Octavo of 629 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1909. Cloth $5.00 net; Half Morocco, $6.50 net.

Few books that have appeared in recent years have been as heartily welcomed by the medical profession. The author has shown his wisdom in undertaking a work which supplements and amplifies, but in no sense supplants the standard American treatises upon diseases of children. Although a valuable addition to the library of the student, it is not designed for a textbook, since the author confines any introductory remarks upon the diseases themselves to such etiological factors as may have special bearing upon the main issue of therapeutics and treatment. Written by one who is fully conversant with the best that there is in pediatric literature and practice, and based upon ample personal experience, it offers to the active practitioner in extended form the most approved methods of treatment.

Five hundred and ninety-one pages devoted to this purpose, exclusive of forty additional pages of admirable index, are a speaking commentary upon the importance which the treatment of the child has assumed in medical work. As a minor matter only we are surprised to find the statement that "an umbilical polyp is an overgrowth of neglected granulations." These persistent masses are made up of the everted and prolapsed lining of the remains of the omphalo-mesenteric duct, and microscopical sections readily show the central opening and the surface studded with glands similar to those of the intestinal mucosa. These give rise to the viscid mucopurulent secretion mentioned by the author, and it is the nature of the mass which accounts for its persistence. The chapter upon gymnastic therapeutics which met with favorable comment upon the publication of the first edition is well illustrated and a valuable appendix to any discussion of therapeutic measures in childhood. It contains, among other things, directions for breathing exercises and for exercises for the treatment of flat chest, hyphosis, scoliosis, congenital ataxias, anterior poliomyelitis, constipation and flat-foot. The appearance of a second edition is but further evidence of its well-deserved success. T. S. S.

LIFE'S DAY. Guide-posts and danger-signals in health by WILLIAM SEAMAN BAINBRIDGE, A. M. M. D. Frederick A. Stokes Company, New York.

The very title of Dr. Bainbridge's book indicates very fairly his purpose. It is one of the developments of the times that the human race is giving more thought to the intelligent welfare of their bodies. They are no longer willing to be kept in ignorance of the factors which play a part in right and healthful living. After a preliminary discussion of the influences of heredity and environment in determining the future of the individual which leaves one with the impression that each has been given its fair value, the remainder of the volume is devoted to the considerations of infancy, childhood, active adult life, old age and death. Only in the chapters upon infancy and childhood, periods when the life of the individual must necessarily be guarded by others, are specific directions given. These chapters are well written and give general information concerning the modern feeding, care, clothing, and airing of infants, with suitable warnings against many of the widespread popular errors, without encroaching upon the domains of the family physician. We should like to see some modification in future editions of the statement apropos of breast feeding that "when the natural source of supply is inadequate as to quantity or quality, resort to artificial feeding is obligatory." Deficient *quantity* of breast milk does not call for total abdandonment of the breast, as statements similar to the author's are interpreted by nine mothers out of ten and too large a proportion of physicians. Too much depends upon maternal nursing for the future welfare of the infant not to have these matters clearly expressed in a volume which will be widely and remotely read in the home. The text is agreeably written and the interest sustained there is evidence of an extensive knowledge of the literature of the subjects treated, and a liberal but wise illustrative use of quotations. While instructive to physicians chiefly in their individual capacities as men or women, it will appeal to all thoughtful laymen who desire a conservative presentation in popular form and language of many of the problems which present themselves from the Dawn to the Night of Life's Day. T. S. S.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Incessant Cries as a Symptom of Heredo-syphilis.—Clemente Ferreira (*Arch. de Méd. des Enf.*, May, 1909) cites a case of heredo-syphilis in which the constant high cry was a peculiar symptom, and one that the author considers pathognomonic of this disease in infants. These children complain continually, and the use of mercurial treatment stops this crying as soon as it has taken effect on the syphilitic virus. In four necropsies in such cases, after the cries had been stopped by the use of mercury, undoubted evidences of the presence of syphilis were found on microscopical examination of the tissues. The author describes the case recently observed by him, in which gastrointestinal troubles and coryza were present.

Sea Water Treatment by Subcutaneous Injection.—Theodore Le Boutillier (*Arch. Ped.*, May, 1909) has employed subcutaneous injections of sea water, as recommended by Robert-Simon, in a number of children. The solution must be prepared from fresh sea water obtained far enough from the coast to avoid sewage contamination, about thirty or forty miles from shore, and at a sufficient depth to avoid surface bacteria. It is made by mixing eighty-three parts of sea water with 190 parts of pure spring water, giving a specific gravity of 1.008. The regions used for injection are below the angle of the scapula and the gluteal region. In infancy the amount injected will vary from 10 c.c. (1/3 of an ounce) to 30 c.c. (1 ounce), the initial injection being from 10 to 15 c.c. In older children the initial injection will be from 15 to 30 c.c., increasing to 60 c.c. (2 ounces), while occasionally 90 c.c. may be given. As a rule, treatment should be given three times a week, with strict regularity. When recovery has taken place, it is well to continue treatment twice a week for several weeks, or to discontinue for two or three weeks and then resume the injections for several weeks. In acute cases it is at times well to give an injection daily for five or six days, depending upon the condition of the patient and need for treatment.

A series of twenty-one nutrition cases containing nine cases of inanition during the first weeks of life showed marked improvement in the gastro-intestinal condition, with a gain in weight varying from one-half to one ounce daily during the period of treatment. The cases in which bronchitis was secondary showed a rapid clearing up of that conditon, those of hereditary syphilis improved more rapidly than before, under specific treatment. Colic was a distressing symptom in three of these cases and here the relief was rapid. The six cases of malnutrition showed marked changes following two or three treatments: the appetite improved, the nervous symptoms were lessened; the number and character of stools showed marked changes; sleep was better, and there was a gain in weight ranging from one to five pounds during treatment. All of these cases had a more or less harsh skin which changed greatly.

End Results of Herniotomy in Children.—H. C. Deaver (*Albany Med. Ann.*, June, 1909) has attempted to trace 100 cases of herniotomy in children. Replies to inquiries in sixty-three of these cases showed no recurrence after from one to sixteen years. He says that if the hernia is small and the truss easily kept in place, it is feasible to persevere in the use of this apparatus. If there is no cure after a year's trial operation should be performed. The truss should be advised only where the mother is intelligent enough to carry out the instructions as to its proper use. It is inadvisable to order trusses among the poor where the care of the children and their environments are not so favorable as among the intelligent classes. Too often in such cases the wearing of the truss offers a false sense of security against accidents, such as strangulation, and the hope that the truss will cure these hernias often proves futile. The expense of the truss must also be considered. Since the operation has practically no mortality, and since the results are so good, radical operation is justifiable, and this wholly irrespective of age. In large scrotal hernias in any class of patients the use of the truss is not advised, because the operation is not serious and the results are perfect and permanent. As to the operation itself, the most important point in the closure of the canal is the separation of the layers so as to get firm union between them in their new relations and, at the same time, to prevent any tension on the deep sutures. The skin incision should not be prolonged too far outward toward the scrotum; not more than half an inch below the external abdominal ring. The sac should be completely removed and, if cut properly, its stump disappears from sight by the elasticity of the peritoneum. The only true indication that the limit of the sac has been reached is the end of the thickening of the same.

Sign of the Grocco-Raushfuss-Hamburger Triangle in Serofibrinous Pleurisy in Children.- J. Brudzinski (*Arch. de Méd. des Enf.*, Feb., 1909) describes the Grocco-Rauchfuss-Hamburger triangle as a triangular area of dullness, whose summit is at the upper limit of the pleuritic exudate, and its outer angle at the external limit of the absolute dullness in the side. Percussion should be performed very lightly, percussing the posterior wall of the thorax so as to distinguish four zones in passing from the healthy to the diseased side of the chest; a zone of normal resonance, one of relative dullness, one of relative sonority, and one of absolute dullness. In this dull triangle the respiration is enfeebled or bronchial; there may be egophony. The dullness disappears when the child lies on the affected side and reappears when he sits up again. The author describes a series of cases observed by himself in the Hospital Anne-Marie at Lodz. This dullness near the spinal column is explained by the absence of vibrations on the side of the chest in which the lung is compressed by the effusion. The sign is also found in pneumonia of children, although here the dullness is never so absolute as in pleurisy with effusion.

Eye and Ear Defects in Children.—Thomas Faith (*Pediatrics*, May, 1909) divides cases of defective sight and hearing into two classes: first, those who cannot be driven to do their work on account of physicial inability to accomplish results with ease and, second, those who can accomplish results and will be urged on by their teacher, parent, or ambition, until they either break down or rebel on account of the nervous strain imposed in carrying on the work. To the first class belong the cases of high refractive errors, congenital defects of the cornea, lens, etc., the cases of congenital word blindness and the cases of defective hearing. To the latter belong the cases of slight defects of vision due to disease, low degrees of refraction errors, cases of muscle imbalance, and cases of deficient accommodation. As these physical defects would certainly tend to cause children to leave or be taken from school at an earlier time than would ordinarily occur, just so certainly would they tend to produce dissatisfied and unsuccessful members of society as the uneducated individual does not have an equal chance with the educated individual in the struggle for existence, all other things being equal.

Post-rubeolic Diphtheritic Conjunctivitis.—E. Weill and G. Mouriquand (*Arch. de. Méd. des Enf.*, Feb., 1909) describe an epidemic of diphtheritic conjunctivitis following measles, in which the complication proved very fatal. Two forms of diphtheritic conjunctivitis are described, one beginning with a catarrhal conjunctivitis, with a thin opaline false membrane, and rarely invading the ocular conjunctiva. The other is a grave interstitial form and always invades the ocular conjunctiva. The lids are very much swollen, hard as cartilage, the palpebral conjunctiva is lardy, pale, and not covered with a false membrane. It occurs only after measles in very young subjects. There seems to be no exciting cause, and the attack of measles may have been a slight or a severe one. With the Klebs-Löffler bacillus are always found streptococci or staphylococci. In all the author's cases the conjunctivitis appeared during the eruption or at its close. Under the false membrane is found a lifeless, gray tissue. The attack comes on suddenly and examination of the eye is difficult on account of the swelling. The cornea is infiltrated, ulcerates, and perforates, and the contents of the eye are expelled. The prognosis is always bad, death almost always following the appearance of the complication. In the experience of the author the treatment was singularly inefficacious.

Diphtherias with Invisible Location (Crypto-diphtherias).—M. Abrand (*Ann. de Méd. et Chir. Inf.*, June 1, 1909) calls our attention to the occurrence of cases of diphtheria in which the membrane is not visible, yet which have the characteristic diphtheria syndrome. In these cases the membrane may exist in the nasopharynx, larynx, bronchial tubes, trachea, or esophagus. These locations are quite frequent in cases of the ordinary diphtheritic angina, but are most important when the membrane does not [appear on the pharynx and tonsils, the usual locations of membrane. Such cases are liable to be diagnosticated late in the disease, after the poison has had a chance to act on the general system, and are liable to paralytic and heart complications as the first symptom noticed of the action of the diphtheritic poison. The author calls them crypto-diphtherias. He describes six cases which came under his observation. They show how important it is to make a careful examination of every obscure case which comes into a hospital, using the laryngeal mirror. The admission of such a case to a general ward endangers the other patients, and the appropriate serum treatment is not given early enough to prevent serious complications, even death. The symptoms that are suspicious are a rapid loss of weight, extreme fatigue, rapid pulse, marked swelling of the glands of the neck, with or without high fever, polypnea, or dyspnea, that are inexplicable. Such cases need energetic antidiphtheritic treatment.

Serum Treatment of Diphtheria Intoxication.—Fritz Meyer (*Berl. klin. Woch.*, June 22, 1909) describes experiments made on dogs poisoned with injections of diphtheria toxin and then treated with antitoxin, as to the effect of the serum on the heart symptoms. In acute toxemia with heart failure he found that the serum treatment would prevent the occurrence of heart failure, but that when the symptoms had developed it had no effect on them, and death ensued. These hypertoxic cases required large doses of serum by intravenous injections. The best method of treating heart failure attacks was by the use of adrenalin. In cases that were diagnosticated late and treated after severe attacks had taken place intravenous injections of serum, were beneficial, and large doses were indicated. Heart changes in diphtheria were prevented by the use of serum, and post diphtheritic cachexia was prevented or was benefited when it had occurred. From these experiments it would seem that large doses of serum injected intravenously were indicated in all severe cases of diphtheria in man.

Acetonuria in Scarlet Fever.—Felix Proskauer (*Arch. f. Kinderheil.*, Bd. l, 1909) finds that, as early as 1857, Petters noted the typical odor of acetonuria in cases of scarlet fever and measles. The author has examined systematically the urine of one hundred cases of scarlet fever, beginning as soon as the exanthem appeared, and continuing the examinations until the end of the disease. He found that acetone was present in variable quantity in all cases, beginning as early as the second or third day and continuing as late as the twenty-sixth day in some cases. In rudimentary cases, without typical exanthem, if acetone is present it serves as an important differential sign from serum exanthemata, since acetone does not occur in the serum eruptions. It has no relation to the duration of the eruption, the amount of fever or the severity of the disease. The cause of acetonuria is not found in lack of nourishment, but in an endogenous carbohydrate inanition, a greater carbohydrate ingestion being needed. The change of fat into sugar is a by-product of the production of acetone by the working of the liver ferments.

Difficulties in the Diagnosis of Scarlet Fever.—J. F. Schamberg (*Penn. Med. Jour.*, June, 1909) says that the rash of scarlet fever, is its most conspicuous symptom, but it must be remembered that an absolutely indistinguishable eruption may be encountered in conditions in no way related to scarlet fever. In very mild cases of scarlet fever in which the rash and general symptoms leave doubt as to the nature of the disease, the tongue often fails to present its characteristic appearance. Furthermore in rare instances the strawberry tongue may be seen in affections other than scarlet fever. These exceptions, however, do not invalidate the force of the statement that a tongue coated with whitish fur which rapidly peels off and leaves a red papillated surface is strongly confirmatory evidence of scarlet fever. Too much importance has been attached to the mere occurrence of desquamation in scarlet fever; the time of the onset of scaling, mode of progression, and its persistence are of more diagnostic importance. Desquamation in scarlet fever is usually observed first on the face, often from the fourth to the fifth day. About the sixth day it is noted on the neck and upper portions of the chest. The hands ordinarily begin to desquamate from the twelfth to the fourteenth day. On the feet scaling may not commence until the third week. Scarlatinoid eruptions begin to scale more quickly, particularly on the hands and feet, and scarlet fever scaling persists longer than that after scarlatinoid rashes. It must not be forgotten that a scarlatinoid rash can be produced by the administration of certain drugs and by varied toxic states, which is followed by most profuse desquamation, exceeding, if anything, that of scarlet fever. This form of desquamative scarlatiniform erythema and the milder forms of scarlatiniform erythema may occur during the course of various infectious processes, such as smallpox, measles, varicella, malaria, typhoid fever, rheumatism, septicemia and pyemia, etc. Diphtheria antitoxin and other sera may likewise evoke an eruption quite indistinguishable from that of scarlet fever. In scarlatiniform erythema, particularly when the rash is well pronounced, the intensity of the eruption is out of all proportion to the amount of constitutional disturbance. The tendency to recurrence is a well-recognized feature of scarlatiniform erythema,.

Scarlatina and Erysipelas.—Milhit and Vasseur (*Prog. Méd.*, June 5, 1909) says that erysipelas and scarlatina are processes associated with the presence of the streptococcus that are found together with some frequency. The serum of scarlet fever patients contains antibodies which act against the streptococcus early in the disease, as early as the fourth day, and then appear as late as the thirty-eighth day. This reaction is lacking in the other streptococcemias. Munch and Eichelberg have obtained the reaction of Wasserman in scarlatina subjects who have no evidence of syphilis. It is scientifically impossible to state that the streptococcus is the cause of scarlatina, but we may say that it is generally associated with the virus of that disease. It is curious to find that a body affected with scarlatina, acting on the glands and throat, can become the recipient of the same germ in the form of erysipelas, not being entirely immunized to the streptococcus by the scarlatina. The prognosis of this association of scarlatina and erysipelas is not as grave as would be expected, being relatively benign. The authors describe two cases of this association observed by them. There are also observed abortive attacks of erysipelas of the face in scarlatina. Erysipelas late in scarlatina is associated with acute nephritis, with which it seems to have a relation. When nephritic exists the appearance of erysipelas is characterized by hematuria. The erysipelas extends rapidly, accompanied by much swelling, heat and tension, but by little fever. It lasts from eight to ten days and is followed by marked desquamation. The general reaction is slight, not being accompanied by chills or vomiting, but there is a marked hyperleukocytosis. The local treatment of the erysipelas is as usual, and the patient is placed upon a strict milk diet, with daily examination of the urine. The organism seems to have been partially vaccinated with the streptococcus, so far as to prevent severe constitutional symptoms, but not enough to prevent the local manifestations.

Serotherapy against the Meningococcus.—Grysez (*Presse Méd.*, May 29, 1909) says that the use of the antimeningococcus sera has lowered the mortality of cerebrospinal meningitis from 50 to 30 per cent. Several sera are used for this purpose, all of which have the common characteristic of directly destroying the meningococcus by their presence; they must be brought into direct contact with the germ by introduction into the cerebrospinal canal. Injected under the skin or into the veins their effect is very slight. Lumbar puncture is made in the fourth lumbar space, with the patient lying on his side, and the back curved as much as possible. Twenty to thirty c.c. of fluid are allowed to escape from the canal before the serum is introduced. This fluid is used for microscopic examination and for diagnosis by cultures. The injection is often without pain. The patient is then placed with the head lower than the body, to facilitate the flow of the serum up the canal. Large doses have the best effect. The immediate effects of the injection are fall of temperature, increase of intelligence, and lessened headache. Stiffness of the neck and Kernig's sign are the last symptoms to yield to the treatment. There may be immediate cure or a relapse later. The injections should be repeated every second or third day, and the prognosis is better the earlier in the case it is injected. The results of the examination of cerebrospinal fluid are interpreted thus: the bacteriologic diagnosis is aided by the finding in the fluid of marked polynucleosis, presence in the leukocytes and free in the fluid of diplococci which are Gram-positive, development in culture media of the meningococcus, and production of a precipitate in the centrifugated fluid, mixed with antimeningococcic serum (reaction of Vincent and Belot).

Diagnostic Value of Lumbar Puncture in Acute Tuberculous Meningitis of Children.—F. E. Sondern (*Arch. Ped.*, June, 1909) states that the following are the characteristics of the cerebrospinal fluid in tuberculous meningitis: Pressure increased; usually transparent and colorless, occasionally slight opalescence; density not much increased; albumin from three-quarters to two per mille by weight; coagulation slight and frail; sediment slight; average number of lymphocytes 86 per cent.; tubercle bacilli found in about 88 per cent. of the writer's twenty-seven cases. In the presence of tubercle bacilli, a relative polynuclear cell increase should stimulate the search for organisms of a second or mixed infection, particularly if the sediment is more abundant and coagulation pronounced. In the absence of tubercle bacilli and other organisms, if relative lymphocyte increase and the other suspicious signs exist in an acute febrile case, the repeated search for bacilli is indicated and the other causes for this combination should be kept in mind, namely, meningism of typhoid, pneumonia, and infectious diseases. Abundant sediment, relatively high polynuclear cell count, firm coagulation, decidedly increased density and large amount of albumin indicate a purulent meningitis and the causative organism, pneumococcus, streptococcus or staphylococcus, is invariably found. The differential diagnosis between this class and tuberculous meningitis never offers difficulty. Cerebrospinal meningitis due to the intracellular diplococcus sometimes presents specimens which closely resemble those from a tuberculous meningitis. The differentiating points are that the relative polynuclear cell increase is high, usually over 85 per cent., even if the number of cells present is small, and that the characteristic organisms are invariably found according to most authors and were present in 96 per cent. of the cases of the writer's series.

Relative Frequency of Abdominal Tuberculosis in Children in Great Britain and the United States.—David Bovaird (*Arch. Ped.*, June, 1909) presents tabulated statistics of British and American hospitals which show that, on the whole, tuberculosis is much less frequent among children in the United States than in Great Britain. They also show that we have, on the average, four cases of meningeal tuberculosis for 1 of abdominal tuberculosis. Comparing this result with that obtained for Great Britain we may safely say, with regard to the frequency of the abdominal localization in cases clinically tuberculous, that such localization is eight times as frequent in Great Britain as in the United States. If, however, we take the frequency of the two types of tuberculosis in the total of sick children treated, we see that on the average abdominal tuberculosis is fifteen times as frequent in Great Britain as in these parts, the figures being 3.25 per cent. of the total treated in Great Britain and 0.22 per cent. in the United States. These figures demonstrate beyond doubt that abdominal tuberculosis is many times more frequent among children in Great Britain than in the United States. From British sources we may take a total of 1.161 examinations showing primary intestinal tuberculosis in 236 = 20 per cent. From American sources we have a total of 620 examinations, showing 3.5 per cent. primary intestinal tuberculosis. Here we have the same contrast that we found in the clinical data and it seems that taken together these figures confirm one another and establish, as thoroughly as need be, that intestinal infection in the tuberculosis of children is many times more frequent in Great Britain than it is here. The writer believes it is in the difference in the fundamental facts regarding tuberculosis in children that the explanation can be found of the apparently irreconcilable views as to the frequency of bovine infections held by the writers of different nationalities, for whatever views may be held as to the interpretation of the localization of the lesions with relation to the question of path of infection, there is general agreement that if infection takes place from milk it will most probably show itself in tuberculous lesions of the intestines, mesenteric nodes, and possibly peritoneum—abdominal tuberculosis in other words. This fact has been amply proven, for all the recent investigations of the type of tubercle bacilli to be found in human lesions show that the bovine type is frequently (70 per cent.) found in cases of abdominal tuberculosis in children and rarely in other cases.

Human and Bovine Tubercle Bacilli.—From the evidence which has been collected, G. B. Sweeny (*N. Y. Med. Jour.*, June 19, 1909) believes: 1. That human and bovine tubercle bacilli are distinctly different in most of their characteristics. 2. That the human subject may become the host for either form of tuberculous infection, human or bovine; likewise that the bovine may be inoculated in the same way and under like conditions. 3. That tuberculous infection of the respiratory tract will usually be found to be due to bacilli of the human type, while those of the bones, joints, and lymphatics are likely to be due to bacilli of the bovine type. From clinical study of cases treated during the past five years, he concludes that an antitoxic vaccine or lymph may be derived from the bovine which has been previously immunized through the administration of attenuated doses of tubercle bacilli, and that this immunity may be accomplished through the use of either human or bovine tubercle bacilli in the emulsion which is used for immunizing purposes.

Tubercular Peritonitis in the Nursling.—E. Weill and M. Péhu (*Arch. de Méd. des Enf.*, June, 1909) find that primary peritonitis of tuberculous origin is comparatively rare. Tuberculous peritonitis occurring in the course of generalized tuberculosis is not uncommon, but the primary form is not frequent. The author published two personal observations. Tuberculous peritonitis in the nursling is characterized pathologically by a marked predominance of the caseous form of tuberculosis, by the generalization of lesions, and by a frequent occurrence of infection of the genital organs, male or female. The symptoms consist of crises of pain in the abdomen, progressive increase in the size of the abdomen, diarrhea, tenderness, and ascites. The course of the affection is afebrile. There is often a purulent flow from the vagina. Rectal examination will show the existence of periuterine, prostatic, or seminal lesions. There may be an umbilical fistula. The glands are generally involved. The general condition is very bad, and the evolution of the disease is toward death. Nevertheless there are cases that are capable of cure. The ascitic forms are more curable than others.

Treatment of Tuberculous Peritonitis by means of X-rays.—G. B. Allaria and G. Rovere (*Arch. de Méd. des Enf.*, June, 1909) have treated seven cases of tubercular peritonitis by means of the Roentgen rays. Undoubted cure was obtained in only one case out of the seven. In one case there was undoubtedly bad effect on the generalization of the disease. In some cases there were no bad effects, even if no benefit resulted. The treatment caused a slight and inconstant increase of leukocytosis. The authors believe that we should be careful in the use of this means of treatment in tuberculous peritonitis, since it is unreliable in its effects. In some cases it is positively curative, not by destroying the bacilli, but by the stimulation of the cells of the peritoneum. In the ascitic form, we may hope for benefit from the rays used moderately and with great care. The action should be most carefully observed and the treatment stopped as soon as bad effects are noted.

Electricity in the Diagnosis and Treatment of Infantile Paralysis.—H. Marques (*Ann. de Méd. et Chir. Inf.*, May 15, 1909) divides the course of infantile paralysis into three stages: the acute period, when electric treatment should not be used; the chronic or regressive period, in which it is of the greatest value, and in fact is the best method of distinguishing the affected muscles, by means of the reaction of degeneration, and the only means of keeping up the tone of the paralyzed muscles until the utmost regeneration has taken place in the spinal cord; and a period when repair has ceased and deformities are being produced, when it is an adjuvant to operative measures. In the acute stage only measures to lessen excitability are best. In the chronic stage, beginning from the fifth to the fifteenth day, according to various observers, faradic irritability is at first lost in all the paralyzed muscles, and the use of galvanism shows the reaction of degeneration in all which are badly affected. If the reaction is entirely reversed the prognosis for that muscle is worse than when it is not. Thus electricity is a great aid in diagnosis and prognosis of the condition of the individual muscles. It is also of use to exercise and keep in tone the recovering muscles and to prevent atrophy. It is the only treatment that gives any results, and the patient that is unable to have it has much more deformity and disability than one who is placed under electrical treatment early in the paralytic stage. Galvanism is used in the form of gentle massage, with as much current strength as will produce fair contractions without pain. It is to be used moderately and at short sittings. Continuous galvanization of each of the paralyzed groups is used first, followed by interruption of the current, the pole that gives the better contraction being used over the muscles. In the later stage, when deformity is coming on, operative measures, such as transplanting well muscles to the tendons of those which are paralyzed, and braces to prevent changes in the joints, may be aided by electricity to keep the transplanted muscles in good condition.

Treatment of Infantile Paralysis.—William MacKenzie (*Inter. Med. J ur.*, May 20, 1909) gives the results obtained by early immobilization of the paralyzed limb in acute anterior poliomyelitis. The function of the deltoid being to raise the arm from the side to a right angle, its zero position would be represented by the latter. In that position it is maintained by means of an upper limb splint and the biceps is rested by flexion of the forearm and raising of the arm. The muscles is later coaxed into action by gradually altering the angle of the splint in proportion to the amount of recovery which has taken place. Of eighteen upper extremities so treated he reports: Ten upper limbs treated within ten days of the onset of the illness were immobilized without massage for from ten to twelve weeks, and of these nine recovered. The case that did badly was that of a child with four limbs and muscles of back and neck, and marked meningeal symptoms. The other limbs have recovered, but the right arm, though improved, is still unsatisfactory. Three cases not rested within four weeks of the onset, the longest time being seven weeks, recovered in the reclining position, and in two on the splint for eight months, also in the mid upright position. Five cases treated with electricity and massage, but no splinting, and with over three months' history and paralyzed deltoid. The most that can be hoped for from the splint is biceps action, and improvement in the condition of the muscles of the wrist and hand.

New Methods of Treatment of Gastroenteritis.—Henri Bouquet (*Bull. Gén. de Thér.*, June 8 and 15, 1909) under this heading calls attention to two systems of diet of exactly opposite character, both of which are used in the treatment of gastro-intestinal complications in infants. One is the water diet, modified by the administration of leguminous or cereal broths, or solutions of chloride and bicarbonate of soda, the object of which is to replace the water drained from the system by the frequent stools, at the same time that fermentable food materials are removed from the diet. When we have initiated the water diet and fermentation has ceased in the bowels the question comes up, and is forcibly brought before us by the mother, how long we can safely keep the little patient on water alone without starving him to death. One of the gruels that is used to give some apparent food value, slight though it be, is prepared from potatoes, carrots, turnips, dried peas, and dried beans, boiled for a long time in a large amount of water, filtered and salted. Another is made of cereals, wheat, pearl barley, dried peas, beans and lentils, treated in the same manner. The diminution in weight of the child ceases and he stops vomiting. Other physicians have given to replace pure water a solution of chloride and bicarbonate of soda. This also prevents loss of weight when combined with broths. The ingredients of these broths seem to have nutritious value, and yet are not fermentable, and the public accepts them gladly. Their real value is in lessening dehydration. Subcutaneous injections of normal salt solutions, and high saline injections have the same effect, but the injections render the bowel irritable after a time. The dry diet has for its object limitation of the amount of liquids taken by the patient. The food consists of eggs, dried cakes and cheese, with a minimum amount of liquids. Its object is to lessen dyspepsia due to the taking of a large amount of milk, in order to obtain a sufficient amount of solids to sustain life. The ingestion of lactic acid bacteria is dependent on their destruction of the bacteria of fermentation in the stomach and intestine. They are administered in the form of bouillon. Intestinal irrigation is less used than formerly. The only medication that seems of value is opium, to control vomiting and stools, and gelatine. The intestinal antiseptics seem of little real value. Gelatin causes lessening of the number of stools; the green color disappears, the bad odor ceases, and the acid reaction passes away. It is administered in a warm sterilized solution, with care not to give cold drinks at the same time.

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ORIGINAL COMMUNICATIONS.

ON POSTOPERATIVE SEPARATION OF LAPAROTOMY WOUNDS (POSTOPERATIVE PROLAPSE OF INTESTINES).*

BY

EMIL RIES, M. D.,
Chicago.

THE surgical accident indicated in the title of this paper is a rather common occurrence, the literature of which is undoubtedly very much smaller than it might be. The tendency to report successful cases and to leave to oblivion cases in which the recovery has not been of the proverbial uneventfulness, is too human to be overcome very readily.

Madelung, in 1905, in *Archiv. fur Chirurgie*, vol. lxxvii, published the results of a painstaking investigation of the literature to which he added his own experience and that of some of his colleagues; so that his paper is based on altogether 157 cases. For the purposes of my paper it is not necessary to increase the number of quotations from the literature.†

Madelung's laborious work has not led to any definite result. The very multiplicity of conditions which, according to him, may favor postoperative separation of the laparotomy wound is a fairly accurate indication of our ignorance of the real cause. A number of observations which I have made seem to me to throw an entirely new light on the etiology of this accident in our surgical technic, for such I hope to be able to prove it in a large number of cases at least.

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* Read before the Chicago Gynecological Society.

† The authors quoted by Madelung will be referred to in this paper under the same numbers under which they go in Madelung's list of references. I have read all the papers quoted by Madelung as far as they could be found in Chicago libraries and a number of papers which have appeared since 1905, but have found nothing in them that would render superfluous the publication of this paper.

According to the condition of the laparotomy wound certain classes of cases have to be differentiated. First, there is the difference between the aseptic and the septic wounds. If the wound is septic, none of us are surprised if the histolysis due to the septic microorganisms prevents the healing of the wound or allows the partially healed wound to separate. I therefore exclude septic cases from our further discussion.

Secondly, laparotomy wounds differ according to whether they have been closed completely or have been left partially open for the purpose of drainage, packing, formation of intestinal fistulas, fixation of stumps in the wound, etc. This paper will discuss more particularly the wounds which have been closed completely. Partially closed wounds are particularly liable to be or to become infected. But besides infection the most important cause of postoperative separation of the wound which is to be demonstrated in this paper, affects these wounds as well as, or even more than, completely closed wounds. The methods of suturing and the kind of suture material employed are immaterial (Madelung, pp. 367 to 369).

The first observation which caused my interest in this problem was made in 1902. A Mrs. L., 45 years old, short and stout, had a ventral hernia following a cholecystectomy, in which packing had been employed. The hernia was the size of a fist. The hernial opening was dissected free without opening the peritoneum and then a suture with formalin catgut (Hofmeister) in layers was performed (one continuous suture of No. 0 catgut for the posterior sheath of the rectus, one interrupted layer for the muscle, one layer No. 0 for the fascia, skin suture with celluloid linen thread). At the conclusion of the skin suture the anesthetic was discontinued and the patient began to awake, became nauseated and vomited. *With a distinctly audible noise something snapped* in the wound. Under renewed anesthesia the skin sutures were removed, and it was seen that *the suture of the fascia had torn, so that the muscle lay bare.* The fascia was sutured again with catgut No. 2 continuously, and after the skin sutures had been placed again the patient's vomiting which accompanied her awakening from the anesthetic was without effect on the sutures. The patient made a rapid recovery, and according to the statement of her physician has no recurrence of the hernia.

This case suggested a line of reasoning as follows: Evidently catgut No. 0 was too thin to withstand the tension of the efforts at vomiting. Now let us suppose that the vomiting had taken place not immediately after the operation while the patient was still on the table, but later on when the patient was in her bed. If the nurse in attendance happened to be absent at the moment, when the patient vomited, or if she did not understand the import of the noise produced by the snapping of the sutures, then we would have been surprised to find later on nonunion of the fascia and possibly a recurrence of the hernia. Furthermore, supposing that not only the fascial layer of sutures, but the muscular layer too, snapped in the absence of a person familiar with such eventualities, there would have been nothing to hold back the intestine except the peritoneum which had not been opened and the skin, and it was to be expected that the peritoneum would bulge out between the gaping edges of fascia and muscle and that there would appear a hernia a very short time after the operation and as large as before. Going a step further, what was to be expected if the peritoneum had been incised and sutured as well as the other layers and if the sutures holding the peritoneum also had given way? Then the skin sutures alone would hold back the abdominal contents, and if the stitches were removed, only the union of the skin, notoriously delicate and friable at the time customary for the removal of skin sutures, would prevent separation of the wound and prolapse of the intestines. Any undue tension affecting the skin scar might cause it to separate after it had been deprived of the support of the sutures.

The next qestion was: Could it be proven that here was the underlying factor in the causation of postoperative prolapse of the intestines? And the answer must be this: the tissues under the integument, if seen soon after the occurrence of the prolapse, must show by their appearance whether their separation had occurred at the moment at which the prolapse took place or sometime before. If the peritoneum, muscle and fascia had all torn open at this time, they would have to appear like a freshly torn wound and would have to bleed more or less. On the other hand, if they had been allowed to separate by a break of the sutures immediately after the operation, then at the time of the prolapse only the skin would have to show the evidence of a recent tearing, while the deeper layers would be found in the condition which any unsutured wound would present after days, that is to say, it would be found *granulating*.

The literature which I had at hand at that time was strangely silent on this point, and even now with the help of Madelung's extensive research this point cannot be cleared up from the literature. Almost none of the papers refer to the condition of the edges of the wound (aside from the question of infection), and the one author, who mentions it, seems to attribute no importance to his findings (see below).

Not until over five years later came the opportunity for a personal observation. My colleague, Dr. T. J. Sullivan, Professor of Surgery at the Post-Graduate Medical School, operated in September, 1907, on a woman of thirty-eight years, performing gastroenterostomy for an inoperable carcinoma of the pylorus. The peritoneum, which was thickened, was sutured continuously edge to edge with No. 1 pyoctanin catgut. Muscle and fascia were sutured continuously with pyoctanin catgut No. 2. The skin was sutured with interrupted silkworm. The patient, who had vomited before the operation, continued to vomit after it for days. But the wound appeared to have healed by primary union when the stitches were removed on the fourteenth day, the day of the discharge from the hospital. On the following day the patient noticed a little moisture on the dressing, but was otherwise perfectly normal and free from pain. When Dr. Sullivan saw the patient on the same day and lifted up the dressing, he found small intestine prolapsed under the dressing. He dropped the dressing back into place and had the patient transported to the hospital, where I was invited to be present at the operation. Before the dressing was removed on the operating table, the above conclusions were gone over, and it was decided to pay particular attention to the edges of the wound in order to confirm or disprove the correctness of the theoretical deductions.

The findings were these:

The dressing contained a small amount of serous fluid with a slight bloody tinge. The skin was free from pus, redness or swelling. Between the edges of the skin protruded a few coils of small intestine, which were a little pink, but glistening and not adherent to the edges of the skin. On retracting the edges of the wound it was seen that *the skin incision showed tiny, fresh, bright, bloody points, while the deeper layers which shelved inward* (see diagram) *were pink, glistening, perfectly free from hemorrhage and presented a perfectly smooth surface in* *which the various layers of the abdominal wall could not be differentiated.* The peritoneum inside was absolutely normal, but its edge was hidden in the granulations. Suture was followed by recovery.

In other words, the condition of the edges of the wound fulfilled completely the postulates constructed after the observation of the first case. My sincere thanks are due to my friend, Dr. Sullivan, for permission to investigate and to publish this very instructive case.

CASE. III.—In November, 1908, a second observation was made which confirmed the first. Mrs. F., a small, rather thin woman, who had never borne children, had been operated on by a physician in September, 1907. He had resected the right ovary and the fimbriated end of the right tube and performed ventrofixation. One year later, in November, 1908, the patient came to me, and after unsuccessful conservative treatment laparotomy was performed under scopolamine-morphine-ether anesthesia (ether, 350 c.c.). The operation lasted 50 minutes. The scar in the skin was excised. In the fascia a gap was found at about the middle of the scar. The incision went through the scar of the deeper layers. The inflamed stump of the right tube, a left pyosalpinx, and adherent and kinked appendix were removed. The uterus which was adherent posteriorly, had drawn out the adhesions produced by the ventrofixation to a ligament over 10 cm. long. This ligament was removed. The abdomen was sutured with sterile catgut, No. 1 continuous for peritoneum and with another layer of the same kind for the muscle. The fascia was sutured with continuous catgut No. 2. Skin suture with interrupted celluloid thread. The patient vomited and coughed for three days after the operation and was uncomfortable for four days after the operation, distinctly more so than we usually see after such operations. The temperature reached 100 only once on the fourth day, but her pulse remained around eighty. The bowels were moved easily with enemas. The patient was up in bed on the day of operation, up in chair on the second day, and walked on the fifth day. After the fifth day she felt perfectly comfortable and she took mixed diet from the third day on. However, as in the absence of any grave symptoms she did not appear just right for a number of days after the operation, the possible causes of the disturbance were discussed in the clinic and the separation of the deeper layers of the wound was mentioned and the treatment discussed.

On the seventh day the skin sutures were removed and there was apparently perfect primary union. About 10 P. M. on the same day the patient sneezed, she held on to her abdomen during this act, but felt her wound open. However, she had little pain and slept most of the night. She rose once during the night and went to the bath-room to urinate. Afterward she went to sleep again. After the sneezing and especially after she had been to the bath-room, she noticed that some fluid was running over her skin, and toward morning she noticed that the dressing was wet with a slightly bloody fluid. The interne was notified, looked under the dressing and saw prolapsed intestine. As the previous clinical discussion of the case remained in his memory, he wisely left the wound alone and notified me. I saw the patient about 10 A. M., that is to say, about twelve hours after the sneezing. The patient had a temperature of 98.6, pulse of 92, and looked perfectly comfortable. She was placed on the operating table and anesthetized with ether. The sterile gause of the dressing was slightly adherent to the intestines. After its removal it was found that the wound had separated to its full length with the exception of 2 cm. at the lower end. Coils of small intestine presented themselves in the lower part of the wound, in the upper angle omentum was visible. The patient pressed a little and an additional coil of intestine was extruded on the left side of the wound. After the patient had been anesthetized completely, the following observations were made: The skin around the incision was perfectly normal. Bowel and omentum as far as they were prolapsed were a little pink, but glistening, with a few white flakes of fibrin on the surface. On the left side the prolapsed organs were not adherent at all and could be replaced with great ease. On the right side the intestine was attached slightly and the omentum in the same way, but not more than, for instance, the bowel would be attached to a sponge at the end of an operation with dry sponges. The entire prolapsed organs were replaced with great ease, and a minute quantity of serous fluid with a slight bloody tinge escaped between them. *The edges of the skin showed a few bright red points. The rest of the abdominal wall shelved inward. The surface of the deeper layers was free from hemorrhage and perfectly smooth. Muscle and fascia could not be differentiated under this smooth glistening surface.* The peritoneum appeared as a white, slightly thickened membrane which extended a short distance outward on the other layers of abdominal wall. The peritoneal edges were easily stripped off and united by continuous catgut suture. Muscle and fascia were separated by sharp dissection and sutured separately with continuous catgut suture. The sutures grasped the tissue at a good distance from the edge and did not cut through. The skin was sutured with interrupted celluloid thread.

Again, therefore, the findings were in entire accord with the theory that the deeper layers had given way long before the skin did.

The patient stood the operation well. It had lasted twelve minutes. On the fifth day after the operation there was a little separation of the edges of the wound in the middle with discharge of a little oil and serum, but no pus. On the eighth day the stitches were removed. On the seventeenth day patient was discharged. Five months after the operation the skin scar was found wide, there was diastasis of the recti, and when the patient pressed there was some bulging of the skin.

A third case not only confirmed the previous findings, but added new features of interest.

CASE IV—In May, 1909, I performed an abdominal hysterectomy on an enormously fat nullipara, weighing 225 pounds, for a fibroid of the size of a two months' pregnancy. The patient had scopolamine-morphine and besides 300 c.c. of ether. The operation lasted one hour and forty minutes. The abdominal suture presented some difficulty on account of the enormous amounts of fat. The peritoneum was closed with continuous plain sterile catgut No. 1, a second layer of the same kind united the muscles and a continuous catgut suture of No. 2 was used for the fascia. The skin was sutured with celluloid thread. The patient vomited considerably the first day, less on the second and third days. On the third day she began to cough a little, but nothing was found on the lungs except a few moist râles here and there. The patient slept little and complained of pain for the first two days, had no appetite, was troubled with flatulency, but her bowels were moved easily with enemas. She sat up in bed and in a chair. At the end of three times twenty-four hours after the operation it was noticed that there was a bloody discharge on the binder, but when the dressing was removed for inspection, the skin suture appeared perfect. A dry sterile dressing was applied. The patient felt more comfortable, coughed less, slept well, and took nourishment with better relish. She sat up in a chair for some time every day. In the clinical presentation the possibility of separation of the deeper layers and its proper treatment was discussed.

The dressing was changed daily and nothing but serous fluid was ever found on the dressing, the skin apparently healing well. At no time was there any gap to be seen between the stitches which allowed the fluid to escape. The temperature reached 100° every evening, the pulse ranged around 110 to 120 for the first four days, then went down to 90 or 100. The crease in the skin under the overhanging pendulous abdomen became slightly eczematous.

Eight days after the operation my assistant removed every second stitch from the skin. He noticed a small amount of serum coming from the lower angle of the incision and applied a dry sterile dressing. One-half hour later I saw the patient and found the dressing moist with a serous fluid. On opening the dressing, small intestine, very slightly distended, was seen lying exposed in the lower angle of the wound, which was separated to the length of about 7 cm. The intestine lay in the level of the skin and did not protrude above that level. The patient stated that after the removal of the stitches she had had an evacuation of the bowels, had pressed and had felt something give. But she was so little incommoded by it, that she took her midday meal in perfect comfort. The operation was postponed on account of the full condition of the stomach, a dry sterile dressing applied, and the patient advised to lie still. Five hours afterward the patient, who in the meantime had received scopolamine-morphine, was placed on the operating-table and anesthetized. The skin was disinfected with tincture of iodine, especially in the crease above the pubes.

The edges of the wound were raised up for inspection where they had separated and were free from hemorrhage. A clear serous fluid escaped from between the bowels in small quantities. *The separated surface of the abdominal parietes was perfectly smooth, shining, and free from hemorrhage.* The bowels were only very slightly adherent and were detached easily.

Now *the first skin suture above the separated part of the wound was cut. Immediately the skin separated and intestine was seen lying under it.* This intestine again was perfectly smooth and shining. One after the other the skin sutures were removed and *as often as one was cut, the skin separated and bowel appeared under it.* Only the uppermost 3 or 4 cm. of the wound did not open up of their own accord and were separated by very slight pressure of the finger. Omentum was seen adherent under this part of the incision. Otherwise the intestine was perfectly free and lay in a large cavity in the subcutaneous fat with hardly any adhesions to the walls of this cavity. The mass of intestine under the skin was of the size of a child's head at least. Bowel and omentum were then covered with two large sponges and handled in this cover as one mass. As the mass was moved sideways the cleft in the deeper layers was seen, through which the bowel had escaped. This cleft was long and narrow, slit-like. *The fascia and the muscle were covered with pink granulations which were smooth and shining.* The peritoneum had retracted a little more on the left than on the right side, but was smooth and glistening. In the lower angle in the neighborhood of the infected skin there were some white fibrinous flakes on the granulations, otherwise the whole wound was free from pus or fibrin. Suture was difficult on account of the enormous amounts of fat inside the abdomen and because the tissue did not hold the stitches, but allowed them to cut through. Through-and-through sutures of catgut No. 2, which were passed through peritoneum, muscle, and fascia together, at last brought the edges together. A reenforcing suture of catgut was placed through the fascia taking hold of the tissue at quite a distance from the edge. The skin sutures were placed at rather considerable intervals on account of the infected condition of the skin at the lower angle. The operation had lasted about twenty minutes and the patient had taken 100 c.c. of ether. The patient made a good recovery and left the hospital fourteen days after the secondary suture with an apparently firm abdominal scar.

The findings, as far as the granulating condition of the tissues was concerned, again proved correct the above discussed theoretical deductions. Besides in the largest part of the wound *the condition, which we had constructed theoretically, was reproduced exactly in the living subject. Here was the skin as the only cover of the abdominal contents. Here were the deep layers separated and granulating, and here was intestine and omentum pushing in between the deep layers. And the skin gave way as soon as the sutures were cut.*

In addition thereto there was found *an apparently perfectly developed ventral hernia* with the wide lateral subcutaneous development with which all surgeons are familiar who have operated on large umbilical or post-operative hernias. If further observations should prove the above findings to be regular characteristics of early postoperative hernias, then we must assume that the peritoneum which invests the sacs of postoperative hernias is a secondary growth of peritoneal epithelium over a preformed cavity, the original lining of which, smooth and shining as it is, is granulation tissue, not peritoneum. For it is not likely that peritoneum should cover surfaces of the size of three or six times the palm of the hand in the course of a few hours or days. Actual macroscopic examination of the peritoneum in this case demonstrated it as terminating at practically normal limits. The growth and development of the postoperative hernia would therefore be entirely different from that of an umbilical hernia.

The greatest interest is attached again to *the granulating condition* of the abdominal walls which in this case was observed about *one-half hour after the separation of the skin*, considerably earlier than in the cases II and III, where twelve and twenty-four hours, respectively, intervened between separation of the skin and investigation of the walls of the prolapse. It is beyond controversy that an interval of one-half hour could not be sufficient to change a torn wound into a perfectly smooth granulating wound. This observation 4 is therefore of the greatest value. The only mention of such findings in the literature is made by Neermann(65) who, in discussing the proper method of suturing after postoperative prolapse, says that suture in layers is out of the question, as the wound surfaces are always smooth, even, mostly bright red and differentiation of the individual layers is out of the question. Neermann therefore made the correct observation, but failed to draw the logical conclusions.

It is not directly stated anywhere in the literature that at the time when the rupture takes place it is a rupture of the entire thickness of the abdominal walls. That, however, seems to be tacitly and generally understood. The theory which we are trying to establish in this paper says, on the contrary, that *the time at which the deeper layers separate precedes by a considerable interval the moment at which the skin separates.*

The observation of the early snapping of the deep sutures as it occurred in our case I is by no means isolated. It was repeated in our work in May, 1908. Mr. F. (Case V), thirty-three years old, a powerfully built man of about 240 pounds, was operated on for acute appendicitis under gas-ether anesthesia. The incision was made through the right rectus muscle, and at the end of the operation peritoneum, muscle, and fascia were sutured separately by continuous catgut suture (No. 1 for peritoneum and muscle, No. 2 for fascia). The skin was closed with Michel clamps. As the dressing was being applied, the patient pressed, gagged, and vomited. Something was heard to snap with an audible noise. The skin clamps were removed and it was found that the entire suture of the fascia had burst open. It was renewed with interrupted catgut No. 2. The patient recovered. Again the question arises: what would have happened if the patient had vomited ten minutes later in the absence of a person familiar with such an accident?

Madelung's extensive research has furnished us with only one observation of this kind. Tournemelle(96) reports that after an operation for ventral hernia the catgut sutures snapped audibly before the dressing was finished and a tumor the size of an egg became visible under the skin, whereupon the proper treatment could be instituted immediately. But it is not recorded that Tournemelle drew any further deductions from this observation.

The above observations explain why so many different causes have been considered in the etiology of the postoperative prolapse. It is noteworthy that in many cases a sudden effort of the abdominal walls has been deemed guilty of causing the separation of the abdominal walls. Madelung records (page 376) that pulmonary affections with cough prevented the healing in thirty-one cases, while in twenty-four cases a sudden coughing spell caused the apparently healed wound to burst open. In altogether fifty-one of his 157 cases the authors accuse cough as the essential cause of the postoperative prolapse. In other cases vomiting is mentioned. Repeated and constant vomiting is referred to ten times, immediately after a vomiting spell the abdominal wound separated in fifteen cases (page 377), altogether in twenty-six out of 157 cases a causal relation between vomiting and the postoperative prolapse is assumed by the authors. Hiccoughing is mentioned once, sneezing once, pressing during defecation five times, and so on. In short, a number of conditions which are accompanied by sudden increase in pressure on the abdominal wounds are reported as having led to postoperative prolapse.

But *in themselves they are all unimportant.* Many patients vomit and many sneeze, cough, and press at defecation without becoming victims of postoperative prolapse. *The essential step is the separation of the deep layers* and only in so far as this is the consequence of any of the above-mentioned acts have they any connection with the postoperative prolapse.

The French authors have tried to differentiate between predisposing and determining causes. According to what has been demonstrated in this paper, there is only one predisposing cause, the separation of the deeper layers due to breaking of the sutures or similar occurrences (see below). With the abdominal contents lying directly under the skin, any sudden tension produced on the delicate scar in the skin is sufficient to burst it.

As long as the stitches in the skin hold the skin together, the skin has a support, which is as strong as the stitches are. Rupture of the skin is therefore particularly liable to take place after the stitches are removed. My three cases all occurred after removal of the stitches, and in Madelung's compilation it is mentioned (page 370) that in thirty-nine cases the postoperative prolapse occurred within three times twenty-four hours after removal of the stitches. Madelung also mentions (page 358) that between the seventh and tenth days after the operation the rupture took place in fifty-nine cases, and as the date on which the stitches were removed in those cases is not recorded here specially, it is worth remembering that the days on which the stitches in the skin, if nonabsorbable, are usually removed are just these days.

There are therefore always *two steps in the postoperative prolapse which are separated by longer or shorter intervals. The first step is the separation of the deeper layers.* The deeper layers then granulate, but do not heal together, because the abdominal contents push in between the granulating edges. *The second step takes place* days or weeks afterward, when *the skin also gives way.*

In my cases I and V it was seen that the *catgut sutures had snapped*, but though probably the most frequent, this is by no means the only way in which the suture can become defective. There are, as I see from the literature, three other possibilities besides the first one of the tearing of the sutures. Mittermaier(63) mentions this first form and says that in his case part of the catgut appeared torn clear across.

2. There is secondly the suture which becomes defective by *the knots coming open.* Rueder (Madelung, page 368) speaks of defective knotting of the suture. Brettauer(12) reports as follows concerning his case: "On inspecting the buried sutures the knots of two silkworm sutures were found to have opened and

a third one loosened, though they had been tied firmly and were not cut closely."

3. Instead of the sutures breaking or coming open, the suture remains solid, but *the tissue gives way*. This can happen in two ways:

3a. *Each stitch can cut across the tissue transversely.* Every operator has seen that when operating on abdominal walls which were under some tension. Ryall(81) reports a case of rupture in which, he says, "the deeper layers of sutures had completely given way, the sutures having torn through the tissue."

3b. A more exceptional and rather peculiar mode of this accident is represented by two observations: Sapiejko(82) reports one of these cases as follows: In an operation for umbilical hernia he had sutured the abdominal wall with silk in three layers, one for peritoneum, one for muscle and fascia, one for skin. Fourteen days after the operation prolapse of the intestines occurred. After separation of the skin edges, it was seen that the two deep rows of sutures had held firmly, but *the fascia and the muscle had torn in the line of the stitch-holes* in the whole length of the wound. One and one-half cm. from the median line a new laparotomy wound had been formed by the tearing of the wall. He cut out the entire sutured mass of tissue and made a new suture in layers. Brettauer(12) in his case III reports that "*the fascia in the whole length of the incision had torn immediately behind the line of stitch-holes*, while the buried thirteen stitches held the two original edges of the fascia very tightly together." Every experienced operator will remember cases, in which at the insertion of a stitch into the peritoneum or especially muscle or the fascia a little longitudinal slit formed immediately instead of the little stitch-hole, which is usually barely visible. If the stitches are all placed very neatly at exactly the same distance from the incision, these slits, if such have formed *or form after the wound is closed completely*, are liable to run together and make a large longitudinal opening, a new laparotomy wound under the skin, which prevents our observation of the deep layers. For a simple comparison I may refer to the multiple perforations on sheets of postage stamps which serve to render easy the detachment of individual stamps. It is quite likely that this form of separation of the deep layers is more frequent than we have been led to believe by the very scant reports in the literature.

4. Form 4 is known in only one instance, which occurred in Madelung's personal experience (page 365). Madelung operated on a young man of twenty-one years for peritonitis following buckshot injury of the abdomen. "Careful suture in layers inside with catgut, outside with silk. A piece of iodoform wick was placed in the lower angle." On the third day after the operation the dressing was changed and the wick removed. A piece of omentum the size of a pea prolapsed through the gap in the suture. On the fourth day patient had severe pain in the abdomen. At the change of the dressing some pus and some foul-smelling bubbles of gas escaped. The skin sutures were cut. "Under the skin lay *a bundle of necrotic tissue as long and as thick as a finger, to which all deep sutures were attached.*" The bundle contained the necrotic peritoneum, muscle, and fascia which was held by the sutures. The case recovered. I mention this case, though I am not otherwise discussing cases in which the wound had not been closed completely. But it is reasonable to assume that the gangrene could have taken place just as well if the wound had been closed completely.

One conclusion from the above is unavoidable: *The separation of the deeper layers is an accident which is not always preventable by any amount of care the surgeon may exercise.* Nobody can prevent the tissue from tearing through, nobody can with absolute certainty prevent necrosis of the bundle of tissue held in the sutures. Every surgeon should know how to tie knots so that they will not reopen; but if such an accident happens in the practice of an experienced man like Brettauer, who will say that it is absolutely preventable? The postage-stamp form of separation of the deep layers might be prevented by using care not to place the sutures at absolutely equal distances from the incision. As far as the snapping of the sutures is concerned, it is a matter of judgment and experience to say what size suture material is the proper one for a given wound. We are all anxious not to place too much or too thick foreign bodies into a wound and most of us probably agree with the advice that the thinnest suture material in the smallest amount which will hold the tissues is the best. But it is a matter of judgment what may be expected to hold, and our judgment is not infallible.

These statements should be borne in mind particularly with reference to the *legal liability of a surgeon* for such an accident. The application of the observations and deductions contained in this paper to the question of postoperative hernia is sufficiently evident without special discussion to cause us to be guarded also in our opinions of the responsibility of a surgeon in case of postoperative hernia.

We have to add that while the tearing of the stitches is not likely to take place without some sudden increase of tension in consequence of vomiting, gagging, coughing, etc., the other three or rather four forms may all take place in the absence of such sudden occurrences. Meteorism after operations is so frequent, that it may suffice for the explanation of almost any case in which the knots slipped, the tissue tore through, or the postage-stamp form of separation occurred. In addition we have to state that even *after the deeper layers have separated* through any of the above-mentioned causes, *postoperative prolapse need not take place.* One very important reason why it should not take place is given by adhesions, as Madelung (page 375) mentions with regard to tuberculosis. Ordinary mild pus infection might do the same.

After we have separated postoperative prolapse into two steps, it becomes our duty to see what can be done in the way of diagnosing the separation of the deeper layers before the skin gives way and the prolapse occurs. This is an entirely different diagnosis from that which Madelung discusses (pages 380 and following).

The diagnosis which is desirable is not the diagnosis of the completed prolapse, but *the diagnosis of* the conditions which have been brought forward in this paper as *the essential causes of postoperative prolapse.* This diagnosis is of necessity left out of all previous papers, because none of them have shown the essential cause of the prolapse.

As a rule, laparotomy wounds are not inspected until it is time to remove the skin sutures, unless there is some special reason for it, like a rise of temperature, pain, discharge of secretions through the dressing, etc. And usually when we remove the sutures the abdominal walls are not handled nor subjected to any special tests for their firmness. Some changes in this routine might be advantageous.

It is needless to dwell on the indications given by audible snapping of the sutures at the end of the operation. But if, after the operation is finished, the patient for days seems uncomfortable, has flatulency, feels soreness in the wound, has a tendency to vomit without peritonitic symptoms otherwise, and, generally speaking, does not appear just right, it may be well to consider among other things the possibility of separation of the deeper layers of the wound. If then a discharge of serum or blood-stained serum takes place through the apparently clean skin wound, the suspicion is strengthened. Then, if the dressing is opened, certain observations may be made which I had occasion to make in a case which I operated on in 1905.

CASE VI.—An Irish laborer of forty-five years, an alcoholic, had an extensive carcinoma of the rectum, which was operated on February 20 by the combined sacral and abdominal route, the abdominal incision being made along the outer edge of the rectus muscle. The abdominal wall was sutured with catgut in layers for peritoneum, fascia, and skin. The carcinoma had been broken into in the course of the operation. The hollow of the sacrum was therefore tamponed. Patient vomited a good deal after the operation, coughed, held himself hanging half-way out of the bed, got up and walked around, disregarding all orders to the contrary. On the day after the operation patient was restless, coughed some. He was taken to the dressing room and on opening the abdominal dressing a considerable bulging of the skin in the region of the incision was noticed. Patient was informed of his condition and advised to have a secondary suture, but refused to have anything done.

On the twenty-second the hernia was larger. Patient vomited three times. On the twenty-third, in order to demonstrate to the patient that his suture had given way, I introduced a probe between the clean skin edges, which dropped into the abdominal cavity without any resistance as far as I allowed it to enter. Patient still refused to have anything done. Patient vomited twice on this day. On the twenty-fourth the patient vomited once and the wound burst open. When I arrived at the hospital, an interne was busy trying to replace the prolapsed intestines, the patient lying on his bed, struggling and pressing. The young physician, shocked by the occurrence, had forgotten all discussions of the proper treatment of such cases and had handled the bowel very roughly. Under absolutely insufficient aseptic preparations he then sutured the abdominal wall. The patient was in poor condition after this treatment and died eight hours later. The postmortem showed diffuse fibrinous peritonitis and extensive infection of the wound cavity in the pelvis. The suture of the intestine had held in spite of all rough handling.

The bulging of the skin and the test with the probe gave excellent evidence of the separation of the deeper layers and might on occasion be remembered with advantage. If the patient had been less unreasonable and independent, the secondary suture performed on the day after the operation would at least have prevented the postoperative prolapse, though it is doubtful whether he would have survived the infection of the pelvic connective tissue. The peritonitis may have been a continuation of this pelvic infection rather than a consequence of a lack of proper manipulation at the time of the prolapse.

If there is no reason for opening the dressing before it is time to remove the stitches in the skin, I pursue now the following plan: Before the skin sutures are removed, the patient is asked to raise himself from the recumbent position, while the physician places an aseptic hand either over the wound itself or over a thin layer of dressing placed over the wound. If the abdominal wall consists only of skin, it is possible to feel that. It might be urged that this very act might precipitate the postoperative prolapse. But as long as the stitches are not removed, there is very little danger of prolapse, and if the test should demonstrate the separation of the deeper layers, then it would be proper to prepare the patient for operation immediately and to remove the skin sutures with all preparations for secondary suture ready at hand. It may take some moral fortitude to tell a patient of the necessity of a secondary suture, when the patient is feeling perfectly well, but a secondary suture will be a lesser evil than a postoperative prolapse or a hernia.

In speaking of the accident under discussion the terms "postoperative prolapse," "rupture of the abdominal wound," "postoperative evisceration" are used rather promiscuously. They are none of them quite correct. Oftentimes the abdominal wound separates, but the intestines do not protrude at all, or at least not above the level of the skin, so that it is hardly proper to speak of prolapse or evisceration. Rupture of the abdominal wound conveys the impression, that the whole abdominal wound ruptures at one time, whereas in fact the separation of the deeper layers takes place at a time preceding the separation of the skin by varying intervals. Also it conveys the idea of a sudden action which is not always correct. "Separation of the wound" fits all of the various forms of this surgical accident better than any other term, and I have therefore placed it at the head of this paper.

100 STATE STREET.

CERVICAL CESAREAN SECTION.*

A STUDY OF THE LITERATURE.

BY

HENRY F. LEWIS, M. D

Chicago.

Delivery of the child through the abdomen has always been attended with much danger. Even now, with improved technic and perfected asepsis, the results are not ideal. One reason for this may be that the Cesarean section, through the inherited fear of the operation, is often postponed too long or is finally performed when some other operation is more properly indicated. Under good auspices and done by experts, the mortality of the modernized classical Cesarean section is no more than that of laparotomy for other serious conditions in the abdomen. Everke in 1906 had brought his mortality down to only 4 per cent. The main danger, aside from hemorrhage, in the usual operation is peritonitis. This is not so much because the peritoneum cannot take care of a considerable number of germs as because of the entrance into the abdominal cavity of nutrient material in the shape of amniotic fluid, blood, and the like from the contents of the parturient uterus. The peritoneum is a wonderful absorber and can easily transfer to the circulation large amounts of toxins resulting from putrefactive infection of the uterine contents. Throughout the history of the operation the main point has always been to prevent uterine contents from entering the peritoneal cavity. It is true that small harm will result provided the uterine contents are aseptic and no infection enters the peritoneal cavity during or after the operation, but one can seldom be certain that the aseptic chain will be thus complete. The sutures in the uterus serve as the defense against contamination from its cavity just as do the sutures in intestinal surgery. The difference is that it is more difficult to apply water-tight sutures to the uterus than the bowel. What have brought the mortality of the Cesarean section to its present low mark are early operation, speedy technic, and careful uterine suturing.

The difficulty of tightly suturing the uterine wound and the dangers of allowing possibly infected material to get into the peritoneum through the sutures have caused the probability of previous infection to be a strong contraindication for the Cesarean operation. Therefore most obstetricians, especially the continental Europeans, would reject it in cases where the membranes had been ruptured for a long time, where examinations of uncertain cleanliness had been made, or where there was a good chance that the genital canal had been otherwise infected from without. This meant that, when the conjugata vera was 6 cm. or less, the child must be perforated. It also meant a choice between a pelvic-widening operation and perforation in intractable labors, even with a conjugata larger than this.

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Frank, of Cologne, at the International Medical Congress at Lisbon, in 1906, reported seven cases operated on by him by what he called suprapubic delivery. He intended his method to be applicable to those cases where either abdominal or pelvic incision was the alternative to perforation of the living child, and where the usual type of Cesarean operation was ruled out by reason of probable previous infection. In 1907 he contributed an extensive article to *Archiv. für Gynekologie*, vol. lxxxi, and reported a total of fourteen cases. Believing that the uterine suture afforded the greatest danger of infection in the ordinary Cesarean section, he practised in 1881 the union of both round ligaments with the parietal peritoneum so as to shut off the area of the uterine wound from the abdominal cavity. This technic he regarded as too complicated. Frank's operation of suprapubic or cervical Cesarean section is performed as follows:

With the woman in the Trendelenburg posture, the abdominal wall is divided transversely a little above the symphysis down to the peritoneum, leaving sufficient stump of the abdominal muscles to permit of good suturing. The incision gapes by contraction of the muscles during the operation, but he says that there is little danger of subsequent hernia because, after the uterus is emptied, the relaxed muscles come well together, especially as the body is ventrally flexed. He thinks that there is less danger of hernia than when the incision is through the linea alba. To obtain a better view he opens the peritoneum, then dissects upward the uterovesical fold and tightly sutures the lower margin of that fold to the lower margin of the parietal peritoneum, thus closing off the abdominal cavity during the subsequent proceedings. The uterus is opened transversely in the lower segment which usually is much bulged out by the head presenting, as he says, "like a cervical tumor." After delivery the bladder sinks into the pelvis. Sometimes the bladder lies high and sometimes low in the pelvis, but the uterovesical fold of peritoneum is always high. The bladder must be guarded from injury. No vesical troubles followed in any of Frank's cases. There is some danger of tearing the peritoneum as was done by many who followed Frank. Delivery through the uterine and abdominal wounds is comparatively easy, according to Frank. His early cases were drained through the uterine wound into the vagina but later he closed the uterus completely unless there was much fear of infection. The tendency to heal is said to be greater after transverse than after linear incision of the uterus because of the direction of the circular fibers. The under side of the uterine wound should be anchored by a temporary suture before delivery of the child so that it may be found the more easily afterward. The uterus was sutured with interrupted catgut sutures, the peritoneum with fine silk, the abdominal walls by deep sutures of coarse silk with intermediate finer ones of catgut.

Frank's indications for his operation are: Necessity of delivery on account of danger to mother or child, with the head free above the brim, the soft parts undilated, and tetanic contractions of the uterus present; prolapse of the cord with living child; threatened rupture of the uterus; in these conditions suprapubic delivery is indicated whether fever is present or not. When the mother is infected, even then the life of the child is to be conserved if possible. If operation aids the child's chances without injuring those of the mother then such operative aid is indicated. Frank thinks cervical Cesarean section not harder for the general practitioner to perform than perforation of the living child.

In Frank's fourteen cases one mother died, having come into the hospital in bad condition with symptoms of tetanus, for which antitoxin was administered. Two children did not survive.

Veit, of Halle, was the first to follow Frank. In an article treating of infection of the amnion he states that even at the present time the ordinary Cesarean section is only safe when the woman has been in the hospital long enough to insure that there is no chance for previous infection. Otherwise the results of the operation are bad. Frank's operation gives the opportunity of shutting off the peritoneal cavity from infection by way of the uterine canal. Veit performed the operation in two cases, both with good results to mother and child.

Fromme considers that cervical Cesarean section should take the place of Porro's in cases where we cannot be sure of the aseptic condition of the mother before the operation. He performed the operation four times exactly according to Frank's method; once where the peritoneal sutures were reopened after emptying the uterus and the peritoneum replaced in its former situation; six others by a modification. He changed the method because of the fear of rupture of the uterus in some future labor at the scar of the transverse uterine incision and fear of hernia from the transverse abdominal incision. His modified technic is as follows:

Instead of the transverse abdominal incision, he makes a longitudinal cut in the middle line through all the layers of the abdominal wall; he separates the peritoneum from the uterovesical fold and as far up on the uterus as it is removable; extends the separation toward both sides; unites this peritoneal flap temporarily with the parietal peritoneum by continuous suture or by clamps; incises the uterus in the median line and delivers the child, then the placenta. Next the uterine incision is closed; the temporary sutures in the peritoneal flaps are removed and the peritoneum is reunited in its normal situation; then the fascia and skin are united in the usual manner. This preliminary suture of the peritoneum is done to keep the cavity dry and free from the uterine contents. He doubts whether virulent streptococcus infection would be influenced by these measures. They are primarily adapted for saprophytic infections. One of the mothers in his first series died from eclampsia, but the rest of the mothers and babies recovered.

Baumm reported to the Breslau society two cases operated upon according to Frank's method. Both had contracted pelves, prolonged labors without engagement of the head, fetid amniotic fluid and many chances of infection before entrance. The first woman recovered, as did her child, but after severe infection with extensive suppuration. The uterus was abnormally fixed forward with the body sharply retroverted. The second case was also severely infected and the mother died within a few days, although the child recovered. In both cases the temporary peritoneal sutures were torn during the operation or the delivery. Later he reports three other cases operated on according to Frank's method. These all had contracted pelves but not such marked signs of previous infection as the former cases. All recovered with their babies. A sixth case was treated by a modified method. The skin and fascia incision was transverse, but the recti were separated in the middle line. The peritoneal flaps were provisionally united with clamps and later sutured; uterine to uterine peritoneum and parietal to parietal peritoneum. Thus the operation was not strictly extraperitoneal, but more transperitoneal, and, as he admits, only adapted for clean cases. The benefits which he considers that it has over the classical Cesarean section: are that the lower part of the uterus is incised where there is less chance of wounding the placental site and where the muscular walls are thin, no intestines come into the field and no fluids get into the peritoneal cavity.

Sellheim has operated upon twenty-one cases in the Tübingen clinic. His technic is greatly changed from that of Frank. Under scopolamine-morphine and spinal anesthesia, with the patient in Trendelenburg's position, he makes a transverse incision above the pubes 15 to 20 cm. long, concave upward, through skin and fat to the fascia; then splits the fascia transversely in the direction of the skin incision; fixes the upper and lower skin-fascia flaps above and below with silk sutures so that the linea alba is left exposed for a distance of about 20 cm.; and splits the recti. This is practically Pfannenstiel's incision. He then frees the peritoneum and subperitoneal connective tissue from the under surface of the recti; partly fills the bladder for orientation of its boundaries; separates the peritoneum from the bladder by the use of gauze and scissors as far as the end of the cervix; pushes the bladder downward as far as the vagina; pushes away the upper peritoneal fold as far as the uterine body; presses the bladder into the pelvis with a retractor; cuts the cervical wall longitudinally in the median line; fixes the cut edges with fine blunt clamps; lengthens the incision up or down as needed, and delivers the child by manual pressure from above; gives ergotin and waits for uterine contraction; then removes the placenta manually and tampons the uterus with gauze, which is led out through the vagina. He closes the uterine wound by one suture of continuous form overlaid by another continuous suture, both of catgut.

In several articles during the last year Sellheim records his progress with the operation. In October, 1908, he finishes a total of twenty-one cases of cervical Cesarean section for various indications.

Eight of the cases were of placenta previa, all with recovery of mothers and children. These remarkably good results for the fetus have led him to formulate the following rules for the treatment of placenta previa:

On diagnosis of placenta previa, with aseptic conditions and a living fetus, perform cervical Cesarean section.

With a dead child, do combined version without immediate extraction.

If the mother is very anemic from hemorrhages one cannot prepare for cervical Cesarean section, but version is indicated.

With known infection of the mother, do version and await spontaneous delivery; with suspected infection, quarantine her if one has time; if not or if infection appears, do version.

He considers vaginal Cesarean section for placenta previa only adapted for "virtuosi."

Sellheim, led by the poor results of one of his cases of infection, devised what he calls "uterus-belly-wall-fistula," to avoid the sometimes extensive suppuration and infection of the large connective tissue spaces of the pelvis incident to cervical Cesarean section. He reports two such operations, one a clean case in which he closed up the wound at once, and the other an infected case in which he left the fistula open until several weeks after delivery and then performed a secondary operation which successfully closed it. The technic is as follows:

A median incision is made in the abdomen; a median incision in the uterus; the parietal peritoneum is sutured to the skin; the abdominal cavity is closed off by sero-serous sutures between the parietal and uterine peritoneum; the bladder is only separated from the uterus below enough to allow of a sufficiently long incision. The most difficult part of the operation is to preserve the boundary between the bladder and the uterus and the fold between the borders of the uterine wound from contamination. The uterus is incised and the child delivered. After delivery the borders of the uterine wound allow themselves to be fixed in the skin margin without tension. The fistula quickly becomes smaller and may heal spontaneously.

Sellheim's total of twenty-one cases embraces one transperitoneal operation, two of uterus-belly-wall-fistula, one according to Frank's method, and seventeen according to his own technic. Seventeen mothers recovered. One mother died on the seventh day from sepsis, one on the second day from eclampsia, one during the operation from pneumococcus meningitis (came in moribund), one at the twenty-third hour from eclampsia. Thus he lost four mothers, all operated on according to his own extraperitoneal method. Nineteen children recovered. One child died from sepsis and pneumonia (the child of the pneumonic mother), one died just before the uterus was opened on account of asphyxia due to knotting of the cord. Thus he lost only two children. Dobbert, of St. Petersburg, is the only one whom I can find following the uterus-belly-wall-fistula operation. He reports one case where there was probably infection before labor. There was some fever for a few days, but mother and child recovered.

Pfannenstiel condemns Frank's method as very likely to cause hernia and to be worse as regards infection than even the classical Cesarean section would be in the presence of actual germ invasion. He thinks little better of Sellheim's modification which employs Pfannenstiel's own incision. This author reports one case done according to the method of Sellheim. The contraction was too great for the employment of hebotomy, to which Pfannenstiel is partial. He found separation of the bladder difficult, especially at the urachus remains, wounding that organ slightly and being obliged to suture it. There was little hemorrhage, the delivery of the child was easy and the uterus contracted well. In spite of the good results of this first case, he would reject all kinds of Cesarean section for infected cases. However, he finds many reasons for recommending the low uterine incision instead of the high one as in the classical Cesarean operation. He holds this opinion because, first, the hemorrhage is less through the thin lower segment and cervix than through the thick contracting portion of the uterine wall; second, the birth of the child is nearer to the natural way; third, the placenta comes away more naturally, usually spontaneously, or at least by Credé's expression, seldom requiring manual removal; fourth, the intestines do not come into sight; fifth, it is easier to prevent fouling of the abdominal cavity by the uterine contents; sixth, postoperative adhesions are in a less harmful place; seventh, this kind of Cesarean section is better adapted for his transverse fascial incision, which he thinks the best for clean cases.

He does not separate the peritoneum or the bladder but goes into the uterus through the peritoneal coating as in the ordinary Cesarean section. He has since operated upon three cases by this transperitoneal method, but in all cases under aseptic auspices.

Two of the women had eclampsia six weeks before full term. The first mother and her twin children recovered speedily.

Vaginal Cesarean section was excluded on account of the rigidity and smallness of the soft parts. The second woman also had great rigidity of the soft parts which prevented the vaginal operation. She did well for two weeks and died suddenly from lung embolism on the fourteenth day. Her child recovered. The last case was one of contracted pelvis in a quintipara whose first three children were born dead or died shortly after birth and whose fourth child was delivered living by hebotomy. In this case he performed elective Cesarean section after twenty-four hours of labor at term by the transperitoneal cervical method. Mother and child recovered without incident.

Küstner operated on two women according to Sellheim's method. Both were primiparæ with contracted pelves whose membranes had ruptured many hours before entrance and in whom there was other reason to suspect the asepsis. Both had foul amniotic fluid. One developed extensive phlegmon of the abdominal wound which required removal of the sutures, but both recovered as did their children.

Rubeska, of Prague, reports a case of cervical section done by the transperitoneal method. The pelvic contraction was of the degree of the absolute indication. Although the woman was a primipara and the labor had not gone unduly long before operation, yet there was severe atonic postpartum bleeding which required uterine tamponade. Mother and child recovered speedily.

Bumm operated upon nine cases by Sellheim's method in the Berlin Charité, which are reported by his assistant, Krömer. Seven of the cases were extraperitoneal and two transperitoneal. The indication was eight times contracted pelvis and once eclampsia. The eclamptic died on the sixth day in coma; the other eight mothers and all the children recovered. Spaeth, of Hamburg, reports one case of transperitoneal cervical Cesarean section done for a highly contracted rachitic pelvis in which there did not seem room enough for hebotomy. The case was aseptic. Separation of the bladder he found difficult and he suspected that he had wounded it, therefore finished the operation through the peritoneum and placed a catheter in the bladder for eight days because of passage of red urine. He considers the operation as well adapted for the general practitioner as hebotomy.

Czyzewicz reports one case of the operation done for osteomalacic pelvis in his Lemberg clinic. The incision in the abdominal wall was made in the median line and the peritoneum bluntly separated from the muscle and from the bladder with considerable ease. The lower segment of the uterus, on account of the long fruitless efforts of labor, was very thin. The extraperitoneal method was selected because of the prolonged succession of pains and because of many unclean examinations outside the hospital. There was so much atonic bleeding postpartum that uterine tamponade was necessary. Mother and child recovered. Hofmeier reports three cases of cervical section, two of the extraperitoneal variety and one transperitoneal. The former were done for contracted pelves in women who had many chances of being infected. The amniotic fluid was fetid in both. The abdomen and the uterus were both opened by longitudinal incisions. In the second case he could not separate the peritoneum from the bladder or abdominal wall, so opened the uterine peritoneum longitudinally and then separated the flaps sidewise.

In this case he cut into the region above the contraction ring and found that, while the bleeding was small from the part of the incision which went through the thinned lower segment, it was free in that part which went through the thicker upper portion.

Both mothers and children recovered, one mother after moderate infection of the endometrium and wound. The third case was intended to be one of classical section, but he inadvertently made the abdominal incision too low and so incised the uterus via the peritoneum through the lower segment. The results were good for mother and child.

Luchsinger, of St. Petersburg, reports an unfavorable case. The woman had a contracted pelvis and had been in labor outside the hospital with ruptured membranes for many hours. The fluids were fetid. Hebotomy was ruled out on account of the desire to rescue the child which was showing signs of asphyxia. The method was that of Sellheim. The peritoneum over the bladder was torn in peeling it off and required immediate suture. Foul amniotic fluid poured over the whole field. The child died on the second day with symptoms of pneumonia, but the mother recovered after suffering from a foul phlegmon of the pelvis and abdominal wound for a long time. Wiemer, of Aachen, performed the transperitoneal cervical section on a woman who had previously been subjected with success to an elective classical operation. There were no fears of infection and the peritoneum was incised. There was some little difficulty in extracting the fetus. The abdominal cavity was shut off by pads from contamination with uterine fluids. The cervical wall had not been stretched and was 1.5 cm. thick. The low incision was selected because of adhesions from the former Cesarean section. The old scar was not disturbed by the second operation.

Hammerschlag reports three cases from the Königsberg clinic. The first was a case of eclampsia in which there was so much edema of the vulva that the vaginal section was discarded. He opened the abdomen by the Pfannenstiel incision and the peritoneum transversely, suturing the upper peritoneal margin to the upper margin of the uterine peritoneum. The bladder was separated downward by blunt dissection so that the lower segment and the cervix lay free. The hemorrhage was slight throughout the operation. Both twins lived and the mother recovered after a few postpartum spasms. The second case was a multipara with contracted pelvis in whom there had been formerly done a vaginal fixation and colporrhaphy. The cervix lay high in the pelvis. He made the transverse skin and muscle incision as recommended by Frank, but incised the uterus longitudinally. There was close union between the bladder and the lower part of the cervix. The peritoneum was opened and then united with that of the uterus so that the incision in that organ was extraperitoneal. There was heavy bleeding. After localized suppuration in the wound the mother and child recovered. The third case was one of eclampsia with amaurosis, and marked vulvar edema which contraindicated the vaginal operation. The operation was like that of the first case. The hemorrhage was small. After twenty-five postpartum seizures the patient and child made an uneventful recovery.

Kahn, of Wilna in Russia, reports a case of a multipara who had a highly contracted rachitic pelvis. Perforation had been done four times and the ordinary Cesarean operation once. On account of the fear of poor union of the abdominal scar if the Cesarean section was repeated this time it was resolved to do the cervical section. Asepsis was supposed perfect. After the Pfannenstiel incision the peritoneum was opened longitudinally. There was so much hemorrhage from the uterine incision that many clamps had to be applied. There was considerable difficulty in extracting the child. The convalescence was interrupted by suppuration of the wound until a silk suture of the uterus was passed. Finally mother and child recovered.

Blumreich, of Berlin, operated upon a primipara in whom the indication was great dyspnea due to an old scar in the trachea resulting from tracheotomy and diphtheria in childhood. As labor went on the dyspnea became unbearable and threatening, cyanosis marked and pulse rate high. During the administration of the anesthetic the patient stopped breathing and tracheotomy had to be done at once. This improved the respiration. After the Pfannenstiel incision the peritoneum was incised and the bladder separated from the cervix. In spite of a purulent bronchitis, the wound readily healed and mother and child recovered.

Franqué, in the Giessen clinic, did the extraperitoneal cervical operation on account of ineffectual labor in a case of highly contracted pelvis where there were many chances of previous infection. The operation was according to Sellheim and with lumbar anesthesia. There was slight hemorrhage from the wound, but a marked bleeding from the placental site postpartum which required tamponade. The puerperium was slightly febrile but without peritonitis, and mother and child eventually recovered.

Franqué prefers extraperitoneal Cesarean section to hebotomy, but believes that it should be entirely extraperitoneal when possible. If one cannot separate peritoneum without incision of it, it should be sutured at once to the uterine layer. For cases of certain and marked infection Franqué would prefer Porro's operation. Bisch reports two cases of the operation done later in the Giessen Frauenklinik for contracted pelves and in the probable presence of infection in the uterus. Both mothers and children recovered.

Jahreiss reports a case from the Augsburg clinic operated upon according to the Sellheim method. There were signs of previous infection in fever and green amniotic fluid. In separating the peritoneum from the bladder a small tear in the former occurred and was at once sewed up. Mother and child recovered after a slight elevation of temperature which subsided after removal of a stinking clot. A transperitoneal operation is reported by Uthmöller, of Osnabruck, according to the general method of Sellheim. This operator made the case transperitoneal because of accidentally tearing the peritoneum. The operation was undertaken for osteomalacic pelvis and was aseptic. Mother and child recovered without symptoms, except a considerable hemorrhage during and after the delivery.

H. Freund and his assistant Klein performed three operations of the Sellheim type in the Strassburg clinic. All were for contracted rachitic pelves, and all had been in labor long enough to have incurred danger of previous infection. Mothers and children recovered without febrile disturbance.

Doederlein and Latzko each claim priority in the introduction of a modification of the operation. The former's technic is as follows:

After opening the abdomen according to Pfannenstiel, he finds the bladder easily visible on account of having been previously filled to moderate degree with sterile salt solution. He finds it easy to separate the tissues and to displace the moderately filled bladder. He draws the bladder toward the right after blunt dissection. He doubly sutures the uterine wall, and only drains when infection is present, and then per vaginam. He reports two cases from the Munich clinic. Both had been long in labor and had been exposed to infection, but both recovered with their children without disturbance. The second case was complicated by a tear of the peritoneal fold above the bladder during the extraction of the child. This tear was sutured at once.

Latzko, of Vienna, impressed by the inconsistency of wounding, by design or accident, the peritoneum during an "extraperitoneal" operation, devised his method with a view of insuring the integrity of the peritoneum. As he says, it is impossible to suture the peritoneum "bacteria-tight."

He reports four cases of his own and one unpublished case of Kozlowski. He fills the bladder with 150 c.c. of sterile water before operating. This brings the fundus of the bladder just above the pubes, and enables one to manipulate the organ easier during the operation. He makes a median abdominal incision 12 cm. long, separates the recti bluntly from each other and from the parietal layer of peritoneum, separates the bladder from the surrounding tissues and the cervix by the fingers and then pushes it to the right side. The peritoneal fold is separated from the lower segment and the cervix and is pushed upward, giving room enough for a median incision in the cervix and lower segment through which to extract the child. At all steps of the operation the peritoneal cavity is supposed to be unopened. He drains when there is fear of possible infection. Such cases are those in which this operation is most likely to be indicated.

His cases had been exposed before entrance into the institution to danger of infection and were cases of contracted pelvis. All the mothers and children recovered. Latzko assisted Rosenfeld in a similar operation with good result to the mother. The child died the next day. There was an anterior fixation of the cervix to the abdominal wall and a marked retroflexion of the body discovered at an examination some weeks after the labor. Fuchs, of Dantzig, reports a similar case of probable previous infection in which he used a small drain. The outcome was good for mother and child. Puppel, of Mainz, reports a case of transperitoneal operation in which he did not see the bladder although it had been partly filled beforehand. He cut down directly through the peritoneum and uterus and differed little in his operation from the ordinary Cesarean section except that his uterine incision was low. The case was apparently aseptic before and after the operation.

It remains for Dührssen to adapt his vaginal Cesarean section to the suprasymphysic method. He reports a case of laparo-colpohysterotomy, which is a combination of both methods. After bag dilatation of the cervix for one hour, he made an incision over Poupart's ligament on the left side through all the layers to the peritoneum, encountering little hemorrhage after tying the inferior epigastric artery. He pushed the bladder to the front and right and the peritoneum upward and dissected down to the vagina. Then he opened the anterior vaginal wall and the anterior cervical wall as in the ordinary vaginal operation. The child was then extracted through the cervical-vaginal wound and the external wound in the flank. The case was aseptic and resulted favorably to mother and child.

Such is a review of the latest modification of the Cesarean section as far as it is accessible to me. All the cases reported are from clinics in Germany, Austria and Russia.

It appears in obstetrics at least that history repeats itself. Frank has really merely revived and modified what had been suggested and even applied nearly a century ago, just as Sänger revived the classical Cesarean section, Zweifel symphyseotomy and Gigli hebotomy. Jörg, in his handbook published in 1820, in the chapter on Cesarean section says that the operation has been fatal in 95 per cent. of the cases, chiefly because air is admitted to the peritoneal cavity and causes fatal inflammation of that membrane. He proposes a modification based on the observations of many obstetricians, notably Boer, of Vienna, that the fetus may be forced into the abdominal cavity after a rupture of the upper part of the vagina. He therefore proposes that, after opening the abdomen low down, the vagina be exposed extraperitoneally and opened for the delivery of the child. He performed one such operation upon a dead woman and suggests that the low incision would be no worse in the living than the high. Ritgen, in his monograph on the indications for mechanical aid in delivery, in the chapter devoted to

Cesarean section (1820), refers to the advice of Mothe, of Paris, published in 1812, who recommended practically the vaginal Cesarean section. Thus was Dührssen antedated by nearly ninety years. Ritgen then recommends the suggested operation of Jörg, considering the happy termination of the extraperitoneal operation for ligature of the external iliac artery. The incision from spine of ilium to pubes is not greater than that required for the ordinary Cesarean section. He gives explicit directions for the operation which much resemble those of Thomas who revived this laparoelytrotomy in 1870. Osiander had already recommended the low incision of the uterus in the classical operation in order to prevent the appearance of the intestines in the wound.

Baudelocque the younger, in his Paris thesis, published in 1823, taking his cue from the elder Baudelocque's operation of vaginal removal of the fetus in ectopic pregnancy, suggests what he calls gastroelytrotomy, evidently independently of Jörg and Ritgen. He makes the abdominal incision to the right of the rectus from the level of the umbilicus to within two inches of the pubes, dissects bluntly the tissues outside of the peritoneum down to the upper vagina which he opens with a blunt-pointed bistoury. In the meantime and probably before even Jörg thought of his method, an American practitioner, hiding his light under a bushel like so many modest Americans, had worked out a similar scheme. Physick, of Philadelphia, before 1824, told his method to a Dr. Horner who wrote to Dewees giving the details. The latter quotes this letter in his text-book published in 1830. Even at that time it seems that the European recommendations had not been heard of. Physick based his suggestions on the careful dissection which he had made of a pregnant woman several years before. He found that the peritoneum of the upper surface of the bladder was easily separated from the vagina and cervix and that the uterovesical fold was raised considerably during the growth of the uterus in pregnancy. He proposed instead of the common Cesarean section, that a horizontal incision of the abdominal walls should be made above the pubes and the peritoneum be stripped from the upper surface of the bladder by dissecting through the connective tissue, which would bring the operator to that part of the cervix where the peritoneum goes over to the bladder. Then a transverse incision could be made into the cervix or lower uterine segment and the child delivered. In very little does this differ from the method of Frank, suggested in 1906.

Ritgen, in 1821, attempted to put his suggestions into practice, but encountered such profuse hemorrhage on cutting the vaginal wall that he desisted and finished by the ordinary Cesarean section. His patient died in a few days, probably of sepsis. Baudelocque made two attempts to follow his own and Ritgen's recommendations. The first time he gave it up because of the severe hemorrhage from the vaginal incision. The second time he accidentally pricked the external iliac artery and therefore tied the common iliac. The case was further complicated by eclampsia, and death occurred on the fourth day. In 1837 Sir Charles Bell suggests practically the same procedure as Thomas afterward worked out.

In 1870, at a meeting of the Medical Association of Yonkers, N. Y., T. Gaillaird Thomas read a paper on laparoelytrotomy and reported the details of such an operation performed upon the cadaver of a woman dead in the ninth month of pregnancy. He also reported an operation done in the interest of the child in the seventh month on a woman moribund from pneumonia. It was a successful case because the child lived one hour. In 1874, Skene, of Brooklyn, had the first chance to perform Thomas' operation. The woman lived only seven hours. In 1875 and in 1877, he did the operation, both times with recovery of mother and child. Gillette, Taylor, Skene, and Jewett performed some successful operations according to the method of Thomas. The total statistics for the Thomas operation up to 1885 embrace twelve cases with saving of six mothers. In none of the fatal cases was the mother's condition such that there was much hope from any procedure. Since 1885 the operation has fallen into disuse as the modern asepsis has permitted opening the peritoneal cavity with impunity and the classical Cesarean section of Sänger is preferred to any roundabout ways.

I have collected 102 cases of cervical Cesarean section done since and including Frank's first one in 1906. Of these women nine died, that is, a maternal mortality of 8.8 per cent. Of the 104 children nine died, an infantile mortality of 8.6 per cent. These operations were performed under the supposedly best hospital conditions and by expert operators. In the majority of them the main indication for the cervical operation instead of the ordinary cesarean section was the suspicion of infection, at least the probability of infection before the operation. The best percentage for the classical Cesarean section is 4 per cent. mortality of mothers, while whatever may be the mortality of the children, it cannot be taken to be influenced unfavorably by the operation *per se*. In the majority of the cases of this 102 the alternative would not have been the classical Cesarean section, although many of them would not have been any worse off with that operation, as the events proved. The alternative would have been in the majority of instances some pelvic-widening operation or craniotomy. The main question as to the value of this operation depends upon how likely we are to have infection following nonaseptic conditions before entrance into hospital. In other words, how many of these cases would have been infected after the ordinary Cesarean operation? The existence of fever before delivery, the presence of fetid amniotic fluid or even the presence of germs in the genital canal by no means certainly indicates that infection would have followed operative delivery of any kind.

Does cervical Cesarean section, either extraperitoneal or transperitoneal, deserve a place in obstetric therapeutics? Is it better adapted for infected cases or probably infected cases than other means at our command? If the danger from infection is chiefly to the peritoneum, we must rule out all the transperitoneal cases, of which there are fourteen in this series. In nearly all of these there was no previous infection observable. Of course in this form of the operation the only advantages can be the lessened danger of hemorrhage from the uterine wound, the less danger of contamination of the abdominal cavity with uterine contents, the better assurance of tight suturing of the thin walls of the lower segment and cervix and the decreased harm from postoperative adhesions.

Frank introduced the operation as one especially to be recommended in cases where there was reason to fear that the case was already infected antepartum. Since most of the operators, especially Frank, open the peritoneum and close it with permanent or temporary sutures before opening the uterus, there is right here a large chance of infecting that cavity when the infected contents of the uterus are poured into the wound. Sellheim's third case illustrates that even with tight closure of the uterine and peritoneal sutures peritonitis may ensue, as was proved at the autopsy. The peritoneum is now well known to be better adapted for resisting invasion of septic and saprophytic microbes than are connective-tissue spaces and extensive wounds of the soft parts.

Close examination of the results does not make them appear as brilliant as the enthusiastic advocates of cervical Cesarean section maintain. The maternal mortality of the 102 cases was nearly 9 per cent. Fourteen of the cases were operated on transperitoneally and were therefore supposed to be certainly aseptic. Forty were probably aseptic before operation. In such cases Cesarean section of the ordinary variety has a mortality of only 4 per cent. The peritoneum was cut or torn accidentally in eight cases. The bladder was injured in three cases. Forty-two of the 101 cases may have been infected beforehand; that is to say, there was in each a probable chance of infection, because of prolonged labor, outside examinations of uncertain cleanliness, early rupture of membranes, or fetor of the amniotic fluid. In only eight cases was there surely infection before operation. There was severe infection after labor causing death in five cases; not causing death in three, and less serious infection, mostly circumscribed, in six, a total of fourteen cases only which gave proof after the operation that the fears of previous infection were well founded.

From the evidence, as stated, it does not seem that the advocates of cervical Cesarean section as a good procedure in infected or probably infected cases have made out a cause. Even for these cases where there is a chance of previous infection it seems that obstetricians are still making too much of a bugbear of the peritoneum. As gynecologists we open the abdomen frequently in the presence of certain infection, often in the presence of virulent infection from the intestinal canal. We are usually able to wall off the general peritoneal cavity from contamination by the contents of abscesses or wounded intestines, which are certainly as septic as the contents of even a fetid amniotic sac. It is not such a very difficult matter to preserve the abdominal cavity from the contents of the uterus by proper placing of laparotomy pads. It is not necessary to bring the uterus out of the wound even in the classical operation. The great danger from entrance of contaminated matter into the peritoneum is the absorption of toxins from what remains rather than the growth within the cavity of septic germs which may gain entrance. In the case of the extraperitoneal cervical section it is the propagation of germs which infect the wound at the time of operation which does the great harm because the connective-tissue spaces have a far less good defense against them than the peritoneal membrane.

Cervical Cesarean section is a more difficult and longer operation than the older form; it requires deep dissection into extensive connective-tissue spaces and admittedly in the probable presence of infection, it often involves considerable difficulty in extraction of the child and leaves the uterus in an abnormally fixed position. For clean cases it cannot replace the ordinary method; for cases of possible previous infection it offers no better chances than the classical operation with careful damming of the peritoneal cavity against the contents of the uterus and tight suturing of the uterine walls, while for cases of certain infection it cannot replace craniotomy.

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Author	*Method*	*Mother dead*	*Child dead*	*Number*
Frank	own	1	2	14
Veit	Frank	0	0	2
Fromme	Frank (4)			
	long incis. (6)	1	0	10
Baumm	Frank	1	0	6
Sellheim	Frank (1)			
	own	4	2	21
	u-b-d-f-(2)	0	0	
	Frank 1	0	0	
Pfannenstiel	Sellheim (1)	0	0	
	transp. (3)	1	0	4
Küstner	Sellheim	0	0	2
Rubeska	trans	0	0	1
Spaeth	Sellheim	0	0	1
Czyzewicz	long in.	0	0	1
Hofmeier	long in. (2)			1
	trans. (1)	0	0	3
Wiemer	Sellheim	0	0	1
Hammerschlag	Sellheim (2)	0	0	
	Frank (1)	0	0	3
Kahn	Sellheim	0	0	1
Blumreich	Sellheim tr.	0	0	1
Franqué	Sellheim	0	0	3
Döderlein	own	0	0	2
Luchsinger	Sellheim	0	1	1
Freund, H.	Sellheim	0	0	2
Klein	Sellheim	0	0	1
Dobbert	u-b-d-f	0	0	1
Uthmöller	trans	0	0	1
Bumm	Sellheim (7)	0	0	
	trans (2)	1	0	9
Jahreiss	Sellheim	0	0	1
Latzko	own	0	0	4
Rosenfeld	Latzko	0	0	1
Fuchs	Latzko	0	0	1
Dührssen	vag-Ritgen	0	0	1
Kozlowski	Latzko	0	0	1
Puppel	trans	0	0	1
		9	5	102

4426 Lake Avenue.

VAGINAL CESAREAN SECTION, WITH REPORT OF FOUR CASES.*

BY

WILLIAM MERCER SPRIGG, M. D.,
Washington, D. C.

It has been twelve years since Duhrrsen and Acconci developed independently the operation of vaginal Cesarean section. The former has enthusiastically urged the advantages of the operation over the slower methods of emptying the pregnant uterus where time is an important factor and in those cases of uterine dystocia in which manual or instrumental dilatation of the cervical canal is especially dangerous to the mother. The profession it seems has been slow to accept and make use of an operation which is rapid, safe and based on good surgical principles.

For a long time the anterior vaginal wall has been freely incised, both transversely and longitudinally, for the treatment of cystocele; the bladder freed from its uterine attachment and planted higher up on that organ in the nonpregnant uterus. The uterus has been freely incised in abdominal Cesarean section, not only once but several times in the same patient, saving both mother and child. Obstetric surgeons are more certain to-day than ever before of the position which should be given to abdominal Cesarean section, showing the general practitioner the brilliant results to be obtained, and urging upon them the importance of making it an operation of election in those borderline cases in which there is a disproportion between the child's head and the pelvic inlet. A conjugate vera of 8.5 cm. in one case may be a positive indication for abdominal Cesarean section if the head cannot be made to engage at the inlet, and in another case, with the same measurement, the head may easily engage.

Vaginal Cesarean section is positively contraindicated in those cases in which the head cannot with safety pass through the pelvis.

The indications for vaginal Cesarean section may be classed under two heads:

1. When the life of the mother or child is in grave danger and

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* Read before the Washington Obstetrical and Gynecological Society, April 2, 1909.

the uterus must be quickly emptied, in which the cervix is rigid and unyielding.

2. Where manual or instrumental delivery is surely to be attended with lacerations, as in carcinoma of the cervix, stenosis of the cervix, rigid os and cervix from scar tissue, etc. A clean-cut wound can be much more readily approximated and sutured.

The question of time must play an important part in determining the need for vaginal Cesarean section. It will be observed that under the first heading it is suggested that the uterus must be emptied quickly in which there is a rigid cervix. A cervix that can be dilated in from forty to ninety minutes may not be considered rigid, provided the life of the mother and child are not in any danger; on the other hand, if she is in eclampsia every minute of delay in emptying the uterus adds just that much more danger to the life of both.

The limitations of this paper forbids more than a discussion of the first section of indications, where the life of the mother and child is in grave danger and the uterus must be quickly emptied in which the cervix is rigid and unyielding. Eclampsia has, and probably always will, present the largest number of cases calling for vaginal Cesarean section. This will certainly be true so long as the etiology is no better understood than it is to-day. It is to be hoped that the time will come when by prophylactic measures the toxemias of pregnancy may be prevented. The case of eclampsia to-day cannot be treated by hope or by the so-called expectant plan, but must be treated promptly and actively if you expect to save either mother or child. The best authorities are agreed to-day that given a case with eclamptic convulsions the safest thing for that woman and child is to empty the uterus, and empty that uterus in the shortest possible time, selecting that method which will give the least traumatism and shock to the patient. Every obstetric surgeon must determine for himself the degree of cervical rigidity, but as compared to the rapidity with which a cervix can be opened by vaginal Cesarean section every cervix is rigid. Every one of us who has performed manual dilatation fully realizes the danger of sepsis in passing the hand into the vagina and uterus when using this method. In vaginal Cesarean section the vagina can be rendered aseptic and maintained so as well as in any vaginal operation, so that the danger from sepsis if anything is less when this operation is performed. Cervical incisions cannot be said to come into competition with vaginal

Cesarean section because of the length of time required to dilate the lower uterine segment, apply forceps or deliver by version. Cervical incision is applicable in those cases in which the cervical canal is entirely dilated and the rigid external os is the only barrier to delivery.

The first case in which I did a cutting operation for emptying the uterus in eclampsia was by cervical incision. The patient was admitted to Columbia Hospital October 30, 1906, case No. 276, white, age twenty-two, primipara, in the ninth month of gestation. Admitted in labor and in eclampsia. She had high arterial tension; internal os and cervical canal well dilated; external os rigid; head well engaged in the pelvis. Urine: specific gravity, 1018; albumin present; hyaline and granular casts and bile present. Urea, 4 grains to the ounce. She had three convulsions before delivery and two afterward. As the external os could not be rapidly dilated an anterior and posterior incision was made through the cervix. The lower uterine segment was manually dilated and delivery was by forceps. The baby lived several hours and died of toxemia; mother recovered. It seems to me that two little attention is paid to babies born of eclamptic mothers. We should recognize the fact that these babies are suffering from toxemia and should be at once put on appropriate treatment. Four days after delivery the mother's urine showed an absence of albumin, no casts, specific gravity 1030, and urea 9 grains to the ounce.

PLACENTA PREVIA.

Vaginal Cesarean section has several times been performed for this condition. In a case in which the placenta is critically implanted, it can more rapidly be delivered by this operation than by either manual or instrumental dilatation because the major part of the operation is completed before the cervix or uterus is opened, and then it is a matter of only a moment to make an incision through the cervix up into the anterior wall of the uterus and manually separate and deliver the placenta, and the child by version or forceps, preferably the former.

The dangers of the operation are the possibility of injuring the bladder and opening into the peritoneal cavity when posterior incision is made. These two possibilities, however, are remote if a careful technic is observed.

In the February number of the AMER. JOUR. OBST. is a paper by Dr. Fry, in which he calls attention to the lack of recognition given this operation by the best text-books of to-day, devoting only short paragraphs to its description and technic.

The technic as carried out in the four cases to be reported was as follows:

The patient is prepared as for a vaginal hysterectomy and placed in the lithotomy position. The instruments required are one perineal and three long vaginal retractors (1 1/2 inchs wide), two bullet forceps, artery clamps, scalpel, one long straight blunt scissors, needle-holder, full curved needles and No. 2 chromic catgut.

First.—The perineum is depressed with the broad retractor and the cervix grasped on each side of the median line. It has been my plan to replace the bullet forceps with two heavy silk traction sutures and tie and clamp the ends well outside the vagina. This does away with the presence of the bullet forceps in the vagina.

Second.—A sound is passed into the bladder to locate the lowest point of its attachment to the uterus.

Third.—The cervix is now drawn downward and backward and the mucous membrane just below the uterovaginal junction is incised laterally, an inch to an inch and a half to each side of the median line. The bladder is now dissected by blunt dissection, with the finger guarded with gauze, to a point as high up on the anterior uterine wall as you wish to carry your incision, which is usually about four inches. A longitudinal incision in the anterior vaginal wall can be made if it is deemed necessary.

Fourth.—A long-bladed vaginal retractor is now inserted along the denuded uterine wall anteriorly, which holds the bladder wall well out of the way and exposes the uterus to the highest point of your intended incision.

Fifth.—With a strong pair of straight blunt scissors incise the cervix anteriorly in the median line to a point as far above the internal os as will give you sufficient room to do a version or apply forceps. The finger of the left hand should have been passed into the cervix and uterus to act as a guide in protecting the intrauterine blade of the scissors. This finger also prevents wounding the membranes until you are ready to rupture them.

Sixth.—The incised cervical and lower uterine segment can now be stretched after all instruments have been removed, the guide sutures remaining loose in the vagina. The fetal membranes prolapse into the wound and can be ruptured.

Seventh.—The fetus is either delivered by version or forceps.

The placenta and membranes manually extracted if necessary. The uterus can now be washed out with hot salt solution and if there should be much bleeding it may be packed with iodoform or sterile gauze.

Eight.—The perineal retractor is again placed in position and the anterior vaginal retractor is replaced, holding the bladder wall well out of the way. Sutures are now placed in the uterine wall at the highest point of the incision, and may be either interrupted or continuous, passing down to but not through the uterine mucosa. The uterus is sutured down to the transverse vaginal incision. The transverse incision and remaining portion of the cervix are closed by interrupted sutures, care being observed to see that the cervical canal is sufficiently patulous to allow free drainage. The vagina is loosely packed with sterile or iodoform gauze, to be removed within twelve hours.

The operation and delivery can be done in from ten to fifteen minutes, and the repair in from twenty to forty minutes, and with a minimal amount of shock to the patient. It will be surprising to note the moderate amount of bleeding which attends this operation. When the posterior incision is made as first recommended by Duhrrsen, a transverse incision is made at the junction of the posterior vaginal wall and the cervix and the tissues separated by blunt dissection from the posterior part of the cervix, not to extend higher up than the peritoneal reflection, care being taken to avoid the rectum or entering the peritoneal cavity. The anterior incision as recommended by Bumm is the only incision in the uterus usually required.

CASE I.—No. 568, colored, age thirty, three-para, admitted to Columbia Hospital March 6, 1907, at six and a half months of gestation. Admitted in convulsions, not in labor. Had four convulsions before operation, none after. Delivery by vaginal Cesarean section and version. Mother recovered, child stillbirth. Urine: specific gravity, 1022; albumin, hyaline and granular casts present; urea three to the ounce.

CASE II.—No. 811, admitted to Columbia Hospital June 14, 1907, white, primipara, ninth month of gestation. Admitted in labor and in convulsions. Seven convulsions before delivery, none after. Vaginal Cesarean section, delivery by forceps, child weighing 4 pounds and 2 ounces. Mother lived; child lived. Urine: specific gravity, 1029; albumin, hyaline and granular casts present. Uterine and vaginal gauze used to control hemorrhage. Coma for twenty-six hours; puerperal mania twenty-four hours. Steam baths and active purgation.

CASE III.—No. 165, admitted to Columbia Hospital November 21, 1907, white, age twenty-three, primipara, seven and one-half months' gestation, admitted in convulsions, not in labor. Five convulsions before operation, none after. Vaginal Cesarean section, delivery by version. Child weighed 4 pounds 2 ounces. Mother lived; child lived. Urine: specific gravity, 1020; albumin, granular and hyaline casts present, urea 7 grains to the ounce. In November, 1908, this patient had a five months' miscarriage, due to a fall down a flight of steps.

CASE IV.—No. 258, admitted to Columbia Hospital February 1, 1909, colored, age seventeen, primipara, eight month of gestation, admitted in convulsions, not in labor. Eight convulsions before delivery, none after. Vaginal Cesarean section, delivery by forceps to head in R. O. P. position: converted into R. O. A. Baby weighed 5 pounds, 12 ounces. Mother lived; baby lived. In this case both the anterior and posterior incisions were made, the posterior incision to give more room and increase the facility in delivery. Urine: specific gravity, 1018; albumin, hyaline and granular casts present. Ten days later, specific gravity, 1022; albumin and casts negative. Thirty-seven days after delivery this patient killed her child by pouring down its throat pure carbolic acid and is now in jail awaiting trial.

THE USE OF MORPHINE AND SCOPOLAMINE IN LABOR, WITH REPORT OF ONE HUNDRED CASES.*

BY

J. HALPENNY, M.D.,

Consultant to Grace Hospital, Winnipeg; Surgeon, Outdoor Clinic, Winnipeg General Hospital, Clinical Teacher in Surgery, Manitoba Medical College,

AND

C. H. VROOMAN, M.D.,

Attending Physician, Grace Hospital, Winnipeg; Demonstrator of Histology, Manitoba Medical College.

COMMON humanity urges the medical man to search for some means to ease the pains of labor. Chloroform has done much to relieve the excruciating agony of the latter stage of labor, but it is also true that accidents have followed its prolonged use. In many cases it has, without doubt, become necessary to apply forceps because of its too early or prolonged use. In how many cases obstetricians have yielded to their own impatience and the importunities of the friends and applied forceps unnecessarily, it would be hard to say, but it is certain there would be no small number. That there is an increase in the use of forceps in confinement is almost universally admitted, nor is this increase altogether to be explained by the impatience or "meddlesomeness" of the modern obstetrician. The reason is, we think,

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to be found in the lessened capacity of the modern woman to bear pain. On this point Professor Kronig (6) says: "In private practice it is only in the minority of cases that the so-called classical indication calls for the application of forceps; by far the largest number of operative confinements is necessitated by nervous exhaustion on the part of the woman and by the want of will power to bear pain to the end. The classical indication for the use of forceps is eclipsed by the so-called deliverance forceps, the application of which has increased in an alarming manner, especially among women of the better class. . . . I do not think that in this instance it is a case of 'furor operativas' on the part of the doctor, but in private practice, in contrast with hospitals, we often have to deal with persons of nervous dispositions, who are overcome by such a state of nervous prostration that every normal effort on their part to endure the labor pains to the end is paralyzed."

The decrease of the birth rate which has been so generally observed in the better classes of the United States, England, and France cannot altogether be attributed to the dislike of the care of children, but in part to the dread and horror many women have of the pains of labor.

Any drug, then, which will relieve or abolish the grinding pains of the first stage of labor without injury to either mother or child should be welcomed by both doctor and patient. That this condition is fulfilled by the combination of scopolamine and morphine is evident to anyone who has given it an extended use or gone carefully into the already extensive literature on the subject. That there are disadvantages and possibly some dangers in its use, is not to be denied, but they are those which are inevitable in the use of an anesthetic in the hands of those inexperienced in its use and careless of the dosage. There have been, and still continue to be, fatalities from the use of chloroform both from careless administration and idiosyncrasy of the patient. The same may, we think, be said of the use of scopolamine and morphine in obstetric work, but if we can prove there have not been more than with chloroform, we submit that they should be given a trial. We do not propose in this paper to consider the use of scopolamine and morphine as anesthetics except in obstetric work, though they have been used as general anesthetics for a great variety of both major and minor operations by many surgeons. Our own experience has been entirely confined to obstetric work.

In 1900, Schneiderlin(23) first reported a series of cases in which he had done a number of operations under anesthesia produced by scopolamine and morphine. Korff(19) and Blos(16) shortly afterward reported a series of cases. Their method was to give morphine gr. 1/6 and scopolamine gr. 1/100 four hours before an operation, repeat in two hours, and repeat again one-half hour before an operation. In some cases they gave as high as 1 gr. of morphine and 1/6 gr. of scopolamine, so that it is not to be wondered at that there were a few fatal cases, though surprisingly few considering the dose. It is to be noted the difference between the dose they used and those considered necessary in ordinary obstetric work.

The *pharmacological action* of scopolamine has been rather fully investigated by Stella,(17) Kochman,(18) Webster,(12) and others, but we are sorry to say with rather contradictory results. The reason of this is probably because of the rather peculiar idiosyncrasy that the animals generally used in experiments have to the action of scopolamine or the allied drugs, atropine, duboisin, etc. It has been found by these experiments that dogs will stand enormous doses of these drugs without apparently any bad effects, while, on the contrary, man seems in some cases to be peculiarly susceptible.

As an example of how resistant dogs are to hyocine and stropine, we might mention an experiment performed in conjunction with Dr. Webster. We injected into the vein of a dog of fifteen pounds, hyoscine gr. 1/100; five minutes later gr. 2/100 and five minutes later gr. 4/100; then at intervals of five minutes atropine gr. 1/20; gr. 1/10; gr. 3/20; gr. 3/10; gr. 6/10 and gr. 1 1/2. At the end of an hour the dog had received hyoscine gr. 7/100 and atropine grs. 2 6/10. The dog recovered, and a week afterward we gave the same dog 1 gr. of atropine at one dose. The animal recovered from that, so we killed it with chloroform. Dr. Webster, though, tells us that he has killed dogs with an initial dose of hyoscine gr. 1/100. The animals, however, if they survive the initial dose, seem to acquire an immunity to the drug, and it can be increased at five minutes' intervals without much effect.

In man one case is recorded in which there was a death after administering gr. 1/20 of scopolamine, but in this case there was a high grade of arteriosclerosis.

The combination of morphine and scopolamine, no doubt, owes its efficiency as an anesthetic, without unduly depressing the circulation, to the supposed antagonistic action of morphine and scopolamine on the respiratory and circulatory centers.

Atropine has long been used as an antidote for morphine poisoning and, as proven by Webster and other observers, atropine, scopolamine, and hyoscine are practically identical in their action on the circulation and respiration. The reason for the use of scopolamine or hyoscine in preference to atropine is that hyoscine and scopolamine have a more sedative effect than stropine. Quite recently Nicholson, (37) of St. Louis, has done a number of experiments on animals. He found that by injecting morphine gr. 1/4, scopolamine gr. 1/100 into a rabbit it produced a deep narcosis, followed by recovery in four or five hours. Injecting morphine gr. 1/2 alone did not produce such a deep narcosis, nor could the animal be operated on as when morphine was combined with scopolamine; when morphine gr. 1/4 and atropine gr. 1/100 were injected, the narcosis was not so deep as when morphine was injected alone. Atropine inhibits in some degree the action of the morphine. He also found that repeated daily injections of morphine and scopolamine produced no degeneration of heart, liver, or kidneys. He found that the toxic dose of morphine and scopolamine corresponds very closely to that of morphine alone, and the autopsy findings in animals which succumb to a toxic dose are as those from morphine.

Though we use scopolamine throughout this paper it is simply for the sake of uniformity, as hyoscine and scopolamine are, as is well known, isomeric chemically and identical in their physiological action, and, as a matter of fact, in the cases which we report below it is the hyoscine tablet of Parke Davis & Co. which we have used almost altogether.

Morphine and scopolamine were first used in obstetric work by Steinbuchel when in 1902 he reported 100 cases. Since then a great number of cases have been reported, but chiefly by the Germans. Most notable among these is Professor Kronig, of Freiburg, who has reported 1700 cases in which these drugs have been used and he is very enthusiastic in its favor. It is rather remarkable in view of these large numbers of cases that English and American obstetricians have been so slow in adopting it. In May, 1908, in a personal communication, the Dublin Rotunda report that they had not used it in a single case; the Sloan Maternity, New York, has never used it; Johns Hopkins Maternity in a few cases, but not enough to report.

The only ones in America which we could find who had used it systematically and published results were Dr. Newall, of the Boston Lying-in Hospital, 123 cases, and Dr. Fenton, of Toronto, 153 cases, and their results have been entirely favorable. Besides the 1700 cases reported by Kronig, Preller reports 120; Bunn, 100; Steffen,(13) 300; Leopold,(27) 200; Bass,(36) 107.

The results from the use of this treatment vary greatly and we are inclined to attribute this lack of uniformity more to the quality of the preparation used than to the method of its exhibition. Kronig's report of favorable results in 1700 cases is the strongest evidence we know of in favor of this method. Some of his countrymen report very unfavorably, however. Geminder,(9) in summing up the results observed in 100 cases at Henge's clinic in Erlangen, declares the method to be dangerous to both the mother and child, stating that serious after-hemorrhage occurred in five cases, while in twenty-seven others the course of labor was disturbed. He regards the measure as presumably responsible for the death of one child, for serious asphyxia in eleven others, and slight asphyxia in twelve. Sinclair,(3) though having no personal experience with this method, says: "It may now be said to have received its final condemnation as too dangerous, both for the mother and child, and unsatisfactory in most other respects," We are sorry he does not state in what other respects it is unsatisfactory; it is difficult to conceive of any effect it could have except on the mother or child As an alternative he suggests morphia-alcohol-cocaine anesthesia. We confess that we have never tried this combination. During residence in Winnipeg General Hospital, we have frequently seen accident cases from railroads where alcohol has been administered by the companions, and morphine given on arrival at the hospital, and we agree that the patient frequently suffered little pain, and hence shock was not increased.

In spite of this fact we prefer not to have the inevitable mental after-effects in our obstetrical cases. To argue against the method in obstetrical cases because he finds it unsatisfactory in minor operations of the puerperium, such as "cleansing septic or pseudodiphtheritic and inflamed lacerations," seems to us to have little force. Steffen(13) says the woman is not able to control the abdominal pressure, and it is very difficult to protect the perineum. We did not experience any difficulty arising from such a cause, neither did we have to resort to abdominal pressure to aid expulsion which he says is necessary at times. Kirby's(5) verdict is favorable, and his conclusion is that labor is not pro longed, but that the patient's strength is conserved by the rest secured between pains. Newell(14) also makes the same observation. He says: "The pain of the first stage of labor was such that the strain of the expulsive pains was endured with less reaction than in the ordinary patient, and not being exhausted by the pain of the first stage of labor, the patients were able to help themselves more efficiently in the final stage."

In a personal communication from Dr. Brodhead, obstetrician to the New York Post-Graduate School, he gives us a summary of the results of its use in thirteen cases in his clinic. "The cases were all primiparæ. In seven cases low forceps operation was done and less chloroform was required to produce anesthesia to the obstetrical degree. Slight delirium was noted in two cases, and in one case where the dose was repeated, the delirium became marked, her uterine contractions were normal; low forceps were finally used.

"In one case there was profuse post-partum hemorrhage, requiring uterine tamponade. In twelve cases where note was made of the presence or absence of asphyxia, in six there was none; in four, slight; in one, moderate, and in one deep. We do not recommend its use, but prefer morphine and chloral hydrate. We do not like the occasional delirium and we are more afraid of the drug than we are of morphine and chloral. We doubt the advantages claimed for the drug."

Butler(2) quotes from fifty observers having in all 5121 cases in which eight deaths occurred. Only two observers, having ninety-two cases, gave a verdict of "bad." K. Myer,(1) in fifty cases, summarized his results thus: In but two cases was there interference with regular contractions. In 70 per cent. there was no hemorrhage, in 24 per cent. it was slight, and in 6 per cent. it was severe. There was vomiting in two cases. In 40 per cent. there was complete effect, in 42 per cent. fair effect, and in 12 per cent. no effect. As to the effect on the child, there was slight delay in establishing breathing in three cases. In one case the child was dead with two turns of the cord about the neck, but at autopsy was found to have a large thymus.

We have used scopolamine in 100 cases. The first case in which it was tried (J. H.), was a primipara, aged thirty-eight years. It seemed to be of such benefit in this case, we were encouraged to give it further trial. A rigid os seemed to dilate more readily and this while the patient was in comparative ease. A little chloroform was administered just when the head was born. There was no laceration, and no ill effects on the mother or child.

Operative interference was necessary in seventeen cases, three occiput posterior, two eclampsia, one where membranes ruptured forty-eight hours before pains commenced, one in a Jewess who had taken absolutely no exercise after the fifth month, and one in a primipara aged thirty-two. In the remaining ninety-two cases low forceps were used nine times. On this point Newell says that with the use of these drugs operative interference is lower than usual without their use, having had fourteen forceps cases out of 123 patients.

Our method has consisted in using hypodermic tablets, the drugs being in separate tablets. The initial dose of morphine sulphate gr. 1/4 and hyoscine hydrobromate gr. 1/100 is to be given when dilatation has well commenced and the contractions are occurring at intervals of five to seven minutes. The room is then darkened and made as quiet as possible and the patient allowed to sleep. In the majority of cases after a period of one to two hours rest the patient wakes with each pain, only to drop off to sleep again after the contractions have ceased. If the patient wakes completely, a second dose of hyoscine hydrobromate gr. 1/100 is given, except in neurotic cases where in a few instances the morphine is repeated either with the hyoscine or alone. In this class of patients there may be some incoherent talking accompanied by flushing of the face, but we have found no real difficulty or danger connected therewith. This has been noticed by various writers with similiar conclusions. We do not endeavor to secure surgical anesthesia. What we do aim at is such a condition that the patient does not remember what happened after the drugs were administered. This was secured in about 20 per cent. In one case forceps were applied (C. H. V.), without the administration of any other anesthetic. In about 70 per cent. the patient rested quietly for some two to four hours, then wakened only with each pain only to dose off to sleep again between pains. In about one-fourth of these cases a little chloroform was used at the time of the expulsion of the head.

The drug is not administered when labor is well commenced, and neither is it administered in precipitate cases. We agree entirely with the opinion expressed by Fenton in a private communication, who says: "Do not give within two hours of delivery, withhold after membranes rupture if there is moderate dilatation of the os and when the cervix is completely dilated, even though membranes be intact If labor be progressing unusually rapidly, better give chloroform instead." The objection to the late administration of the drug is twofold: first, the anesthetic effect continues too long on the mother after labor is terminated; and, second, it is in such cases that difficulty is found in resuscitating the child.

Effect on the Mother.—Apart from the slight mental disturbance already noted, and which was of no consequence, no untoward symptoms were observed. Labor was not interfered with, no cases of postpartum hemorrhage occurred, and no untoward after-effects were observed. Rather was it our opinion that in proportion to the success of the anesthesia was the patient freer from symptoms, frequently observed in other cases of more or less nervous exhaustion. In one case an observant nurse gave the unsolicited opinion that the patient recovered much more quickly from the effects of labor than in cases in which the drug was not used.

Newell (personal communication), speaking of the results found in his clinic, says: "I have seen no bad results in any of the cases in which it has been used under my supervision, but some of my colleagues will claim that they have had unfortunate results, though as far as I can ascertain there has been no increase in unfortunate symptoms in the cases in which scopolamine has been used over what we used to meet from time to time before scopolamine was heard of.

Effects on the Child.—Two premature children where labor was induced for eclampsia were born dead; one child in occiput posterior with a prolapsed cord was born dead, and one child was dead about four or five days before birth. All others were born alive and no difficulty was experienced in having to resuscitate the child except in the case of the Jewess mentioned above. Here difficulty was met with, but it finally came to all right. No other ill effects were observed.

In conclusion we wish to say that we find morphine and scopolamine when carefully administered will safely alleviate consciousness of the pains of labor and in many cases abolished any remembrance of pain.

We have observed no bad effects on the mother, though there may be minor symptoms, as delirium, flushing of face, etc.

We have observed only one case in which there was some asphyxia of the child, and in this case the symptoms were not dangerous.

We do not think that labor is delayed, but rather that the time is lessened, but we have not had enough cases to judge on this point.

We think the drug should be used only when the patient is in a hospital or is attended by a good trained nurse, this not because we regard the method as a dangerous one, but because the sympathizing friends would not allow the patient to be quiet enough to get the full benefit and, in addition to this, the bystanders would be very much alarmed at the little mental disturbance which occasionally occurs.

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215 McIntyre Block.

PANCREATITIS.*

BY
TRUMAN ABBE, M. D.,
Washington, D. C.

THE inflammatory diseases of the pancreas have recently been demanding so much attention and seem to offer such hopeful results from surgical treatment in the hands of the men who have been doing this work that it seems well worthy the consideration of all men who are doing abdominal surgery.

Attention was directed toward the pancreatic inflammations very prominently in 1889 by the masterly paper of Dr. Fitz, and more recently experimental work and clinical study has been shown in the work of Opie, Robson, Moynihan, Cammidge and others.

This paper will deal with the inflammatory conditions in the pancreas, and refer to cancer, stone, cyst, syphilis, tuberculosis, etc.

Only as necessary to help understand the inflammatory diseases, clinically, the types of inflammation are called acute, subacute and chronic. But these three divisions merge into one another so that the pathology becomes confused. The most acute cases are those showing extensive hemorrhage into the pancreas and its surrounding tissues. If the hemorrhage is smaller the symptoms are less acute and tend to follow either a mild short course with recovery or to develop into the subacute type which is generally classed as gangrenous or (if infection follows) to become suppurative pancreatitis. The chronic cases according to Opie may follow either of two courses: One, the more common, the interlobar, in which wide bands of connective tissue are found between the lobules of the pancreatic tissue, seems to follow obstruction or inflammation of the ducts, and implicates the Islands of Langerhans only when the sclerosis is very far advanced. And since diabetes seems to be in many cases dependent upon the integrity of these bodies, glycosuria appears only at a very late stage. Opie reported twelve such cases in which only one, a very advanced case, gave any signs of diabetes. The second type of chronic pancreatic inflammation Opie calls interacinar. In this there is a diffuse infiltration of the entire gland with fibrous tissue separating individual acini and invading the islands of Langerhans early. The ducts are not commonly obstructed. In three of these cases two were associated with diabetes and the third with hemochromatosis, a condition which later is complicated by diabetes.

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Pancreatitis occurs twice as often in men as in women according to Opie, and most often in obese persons between twenty and fifty years of age.

The causes leading to inflammations of the pancreas are obstruction or infection of the ducts. Among these the most important seems to be the presence and passage of gall-stones. A large gallstone lodging in the papilla of Vater may completely obstruct the pancreatic duct, and a small stone lodging in the papilla may block the orifice of the papilla and force bile into the pancreatic duct. Flexner showed by animal experimentation that the injection of the pure bile salts into the pancreatic duct produced hemorrhagic pancreatitis, while injection of bile mixed with mucus set up a subacute inflammation possibly owing to the slower penetration of the colloid mixture. Another important causative factor tending both to obstruction and infection of the ducts of the pancreas is duodenal catarrh or gastroduodenitis where the blocking of the common orifice of the pancreatic and bile ducts is evidenced by the frequent jaundice with the duodenitis.

Other factors tending to produce inflammatory conditions in the pancreas are pancreatic calculi, cancer of the head of the pancreas or of the papilla of Vater or ulcer of the stomach, pylorus, or duodenum or their scars and adhesions, intestinal worms, injuries to the pancreas, infectious diseases, especially typhoid fever, influenza, and mumps. The effects of typhoid fever and the intestinal type of influenza are easily appreciated and the mumps effect is expected when we think of the pancreas as the intestinal salivary gland as it has been called by some physiologists. Haggard says that there is a history of mumps in 10 per cent. of the cases of pancreatitis, and Cammidge gives the history of a boy who on April 22 had a distinct attack of mumps in an epidemic of thirty-two boys. Five days later this boy vomited, had epigastric pain, tenderness and swelling, and his urine showed a clear pancreatic reaction. No operation seemed necessary and the boy recovered. This was one of four cases which showed pancreatic trouble in the thirty-two cases of mumps.

As exciting cause of an acute attack, in addition to the bacterial infection there is the physiological distention of the blood vessels of the pancreas when the gland is at the height of its active secretion one to two hours after a meal. This is mentioned occasionally in the case histories in the literature and is prominent in the history of the author's case given here at length.

The symptoms in the acute cases come on usually out of a clear sky. The person may have had previous attacks of indigestion or epigastric pain resembling biliary colic or gastritis or perhaps have had attacks of catarrhal jaundice some time before. In about 20 per cent. according to Gessner there have been attacks typical of gall-stone colic, often with jaundice. But previous to this attack the patient is usually in good health. In the acute hemorrhagic cases the patient is suddenly taken with a sharp pain in the upper abdomen. The pain is of the extreme type and from its location suggests not infrequently the diagnosis of acute indigestion, acute intestinal obstruction, perforation of a duodenal or gastric ulcer, biliary colic or rupture of a gall-bladder, gangrenous appendicitis or acute ptomain poisoning. It is accompanied by nausea, vomiting, restlessness, anxiety, weakness of the pulse and collapse. And the collapse not infrequently is extreme so that the patient does not rally but dies in a few hours from a condition well meriting the name of abdominal apoplexy.

In the subacute cases, the gangrenous type, the symptoms may be milder from the start or may follow in the course of the acute case. The violent epigastric pain may abate and the vomiting lessen, and after three or four days there develops or becomes apparent distention of the abdomen with a more or less definite extremely tender mass in the median line above the umbillicus. This mass is due to either a tumor in the lesser peritoneal cavity or the exudate and adhesions around the swollen hemorrhagic gland that is becoming gangrenous. After the stage of collapse the body temperature rises and may run up to 104°. Jaundice also appears in some of the cases (20 per cent. according to Fitz) and is associated with an intense pruritus that is not found in pure hepatic jaundice. The pruritus may be present, even independent of jaundice. Soon the symptoms of the associated peritonitis become dominant. The acute constipation usually present at first, frequently develops into a diarrhea and later blood or necrotic tissue may be passed. In a certain proportion of the cases the symptoms gradually subside, and without any treatment directed at the source of the trouble the patient gets over the attack and may get entirely well or proceed into a condition of chronic pancreatic disturbance, or in perhaps the second week show the evidences of necrosis and suppuration by the onset of chills and irregular temperature and that may continue until absorption or death from sepsis. Among the cases that get well without any specific treatment are those in whom laparotomy has been done, fat necrosis found in the subcutaneous and omental fat, a mass of inflammatory adhesions and blood clot or blackened masses found in the region of the pancreas and no means taken to relieve the condition.

In the chronic cases we have a much better opportunity to examine the condition and make a diagnosis, but the diagnosis is not easy to make in the early stages. The onset is usually gradual and painless though it may first be noted at the time of an attack of severe epigastric pain perhaps followed by jaundice and simulating an attack of biliary colic. It may be accompanied by nausea and vomiting, and followed by chilliness and fever. The local symptoms of pain and tenderness in the epigastrium are less marked than in the acute cases. Jaundice is present in the cases where the common bile duct runs through the head of the pancreas, about two-thirds of the cases, or if both pancreatic and biliary ducts are inflamed. At such times the gall-bladder is usually distended. Between the attacks of epigastric pain the digestive and metabolic disturbances due to the interference with the formation and evacuation of the pancreatic products assume prominence. There is dyspepsia with loss of appetite, offensive eructations, flatulence, a distaste for the fats and proteids that are not now easily digested. Emaciation and progressive weakness are always present and often extreme. The nausea and vomiting that are so characteristic of the acute cases are absent altogether in many of the chronic cases during the course of months or years. There may be an increased flow of saliva bringing into evidence again the relation of salivary and pancreatic glands. Later, especially when jaundice is present, general hemorrhages are very likely to occur especially from the mucus membranes of nose and intestine and under the skin. When the Islands of Langerhans are involved in the fibrosis, symptoms of diabetes develop.

The character of the feces in most of the cases is characteristic. They are bulky, soft, greasy, pale colored, extremely offensive in odor and diarrheal though not liquid. They contain undigested food, especially fat and muscle fiber. The quantity of fat that is absorbed from the intestines is decreased one-half or more, so that at times three-fourths of the bulk of the stool is undigested fat. The presence in the stool of undigested muscle cells is one of the most characteristic features of the stool and is almost pathognomonic of disease of the pancreas. When the muscle fibers of the meat eaten are found intact in the stool their nuclei still being evident in a patient not having a diarrhea it is very probable that there is a deficiency in the pancreatic juice in the intestine. The quantity of bile in the stool may be diminished, but is not so characteristically absent as in cancer of the pancreas. In the late stages blood is very likely to be present in the stool.

The examination of the urine may show albumin, and at a late stage when the Islands of the Langerhans are involved sugar may be present. Crystals of calcium oxalate are usually in evidence. The urine also shows the presence of the degeneration products of the pancreas as indicated by the Cammidge reaction. This Cammidge describes as due to certain pentose bodies in combination which when boiled with hydrochloric acid and then tested for sugar by the phenylhydrazine test give peculiar yellow sheath crystals that may be differentiated from ordinary sugar glucozone crystals by their solubility in sulphuric acid, and their melting-point if there is any doubt about the difference in the shape. This reaction Cammidge does not claim to be pathognomonic of disease of the pancreas for it is produced by the breaking down of any tissues containing these pentose bodies, but these bodies are of greatest abundance in the pancreas, and if disease of other organs can be eliminated, a positive reaction is very probably due to disease of the pancreas. The test is positive in practically all cases of inflammation of the pancreas though it may not be present in other diseases of the pancreas unless there is an associated inflammation. If there is a distinct deficiency in the pancreatic juice in the intestine and salol be given in divided doses, making up sixty grains in a day, and then the urine be tested for salicin and phenol they will be found absent while with normal pancreactic juice the salol is broken down and its products can be found in the urine. The tests with keratine-coated capsules containing iodoform which normally are dissolved by the pancreatic juice and liberate iodine in the urine is not considered as satisfactory a test as the salol test. A temporary gycosuria of alimentary origin may be produced by giving 100 grams of grape-sugar in the morning on an empty stomach, while with a normal pancreas this quantity of sugar would be absorbed without affecting the urine.

It is interesting to note in this connection some experimental evidence on the relation of diabetes to disease of the pancreas which shows that while removal of the entire pancreas may produce glycosuria, removal of a portion does not, and cutting of the ducts of the pancreas does not always produce glycosuria. Diabetes is however associated with diseases of the pancreas in about 75 per cent. of the cases of diabetes.

The prognosis in the acute hemorrhagic cases is dependent upon the extent of the hemorrhage. A large number of the cases never recover from the primary collapse but die inside of a few hours. Others of milder grade, even when they receive no treatment for relief of the essential pancreatic condition, pass into the later stages of gangrenous or suppurative inflammation from which more get well. The statistics for cases not operated on are very unsatisfactory, as the diagnosis is doubtful in many of the cases reported unless confirmed by autopsy. Of the cases operated on Mickulicz-Radecki give nine recoveries in forty-six cases. Robson gives twenty-three recoveries in fifty-nine cases. In the subacute cases Robson gives nine recoveries in fourteen cases. Of the chronic cases lasting months or years, if they take their natural course they die of asthenia, diabetes or hemorrhage, but when operated on many can be saved. Robson reports twenty-four cases operated on. One operated very late in the disease died directly from the effects of the operation. Two died a few months later and the others made complete and perfect recovery.

The treatment of the cases during the acute stage of collapse, pain and vomiting, is medical—to pull the patient through the sudden collapse with morphine and perhaps even chloroform or ether for the pain. Lavage and feeding by nutrient enemata with subcutaneous salt solution. Unless the collapse is extreme it may be wise to do an immediate operation with drainage of the lesser peritoneal sac and possible examination of the bile passages and removal of the stone if found. Robson suggests that if the patient will stand the handling to do a primary laparotomy for diagnosis and removal of calculi if found and then drainage posteriorly by a deep incision in the left costovertebral space made sufficiently large if desirable to allow the entire hand to enter the pancreatic region and enucleate clots and necrotic tissue. The subacute gangrenous and suppurative cases need the same line of operative treatment.

During the operation fat necrosis in the omentum or in the subcutaneous fat frequently is found and is characteristic of acute inflammation of the pancreas, and is due to the invasion of the tissues by the fat-digesting ferment from the pancreas. One danger of these operations is the increased tendency to hemorrhage which according to Moynihan is much less in patients jaundiced from gall-stones than in those where the jaundice depends on pancreatic disease. This tendency to hemorrhage is controlled to certain extent by the administration of calcium oxalate for one to two days before operation in doses up to 60 grains a day.

In the chronic cases, while it is desirable to put the patients on a careful and appropriate diet and to give a certain amount of stimulation of the bile passages, it is also desirable and essential to remove the causes of the fibrosis such as alcoholism, worry, and so on, and it is also essential to treat the duodenal catarrh, ulcers, and remove gallstones, but the treatment that is directed at the pancreatitis is drainage and sterilization of the pancreatic ducts and this can best be done by operation upon the bile ducts. If there is a stone in the papilla of Vater incision of the duodenum and then incision of the papilla which is left open for future drainage is desirable, otherwise either a permanent drainage of the gallbladder into intestines or on the skin is essential. The cholecystenterostomy would be the operation of choice except for the possibility of the closure of the opening unknown to the physician and consequent return of the symptoms. Such a case is reported by Robson where everything went well after a cholecystenterostomy for three months and then the opening closed and the symptoms returned. Hence cholecystostomy is the preferred operation, the opening on the skin being maintained until it is very evident that the symptoms are all gone and that a full sufficiency of bile is passing by the normal channels into the intestines. The possibility of a subsequent pancreatitis should therefore be born in mind in all cases of operation on the gall-bladder and seriously considered before a cholecystectomy is done.

The following cases (incomplete in many respects) have been seen within the past year and seem to deserve the diagnosis of pancreatitis on a clinical basis, though they have not been corroborated by the pathological findings.

Case I.—Mrs. T., a white woman about forty-five years of age, was seen September 10, 1908, with Dr. Wynkoop. For five months she had been having indigestion, pain in the abdomen and nausea. Jaundice had been present, increasing to a marked degree, subsiding and increasing again. The pain in the abdomen had increased continually. Six weeks ago she had had blood in her stool on two occasions. On examination she appeared markedly jaundiced and mentally torpid, answering questions that were sharply asked but not speaking of her own accord. There were slow athetoid movements of the arms, hands, legs and head. Abdominal examination showed epigastric tenderness. The urine had a specific gravity of 1026, was acid in reaction, dark colored, pigmented with bile. There was neither albumin nor sugar. Many calcium-oxalate crystals were present, and the Cammidge reaction was positive. Operation was refused and the condition progressed steadily for the worse until the patient died five days later.

Case II.—G. S. T., a white woman, a patient of Dr. I. S. Stone, suffering for years with attacks of biliary colic sometimes with jaundice and sometimes without. Abdominal examination showed jaundice, tenderness over the region of the gall-bladder with more or less rigidity. Urine examination showed bile, calcium-oxalate crystals, no sugar or albumin, but the Cammidge reaction was positive. On operation a stone was found in the common bile duct, adhesions of omentum to gall-bladder, duodenum and pancreas, but no distinct hardening of the pancreas. The calculus was removed by Dr. Stone and the wound drained temporarily. Uneventful recovery followed.

Case III.—F. M. A. was a white woman about sixty-five years of age. Her parents had died between the ages of sixty and seventy from unknown causes. A sister died at the age of seventy with diabetes and nephritis. A twin brother is living and well. The patient was the mother of three healthy children. Had never had syphilis, was a total abstainer from alcohol, and led the simple life. She had had the usual diseases of childhood. At about the age of twenty-six, after jumping from a window to escape from a burning building, she sustained an injury to the spine that produced a slight but distinct permanent lumbar kyphosis. At twenty she had had a severe attack of small-pox. At the age of fifty two clearly defined attacks called biliary colic with acute pain in the right subcostal region, fever and jaundice lasting several weeks, but there had been no recurrence of that type of pain or of the jaundice since. Ten years ago she had an attack of herpes zoster with its intercostal neuralgia on the right side. Five years ago, apparently after some overexertion, there set in muscular exhaustion, thirst, fever, polyuria, and vulval pruritus, and gylcosuria estimated at the first examination at about 7 per cent. On a moderately restricted diet the sugar disappeared completely in two months but returned again at intervals during the next years after overexertion or marked increase in the sugar of the diet. Moderate quantities of starches could be eaten steadily without glycosuria. For a year or more she had no sugar in the urine. Two or three times she had a condition of somnolence simulating diabetic coma but never deepening into true coma. These states usually followed overexertion and worry and were accompanied by fever, sometimes to 102 degrees. At such times the urine would show some acetone, or diacetic acid, the quantity of sugar never being more than 2 or 3 per cent. During these several years on a diet that excluded cane-sugar but allowed bread, cereals, and all fruits in limited quantities the sugar stayed usually below 1 per cent. and never rose over 3 per cent. The fatty elements of diet were never acceptable. At times there was a trace of albumin in the urine with some casts. One year ago, after undue mental and physical exertion with the albumin at a fraction of a per cent. and the sugar below 1 per cent., there developed marked fatigue, drowsiness, almost complete suppression of urine for two days, and general edema. This was present in large quantity and many casts also disappeared in a few weeks with rest, diet and diuresis. After that time there was never any sugar in the urine. Ever since the onset of the glycosuria there had been slow but progressive loss of strength and flesh, and for three years occasional pains referred to the right shoulder most marked in the evenings, an hour or so after dinner, and these persisted and grew worse.

During the month of June the loss of strength progressed so that a walk of 100 yards was tiring and accompanied with intense pains in the epigastrium extending up to the right shoulder and to the deltoid region. July 17 she passed a few clots of blood per rectum. About the same time these evening pains became distinctly worse, and on the twenty-third were unusually severe and protracted. For several nights previous she had gotten up during the night to get relief by sitting in a rocking-chair tipped way back, and on the twenty-third she slept several hours in the chair before she could go to bed. She had been very hungry for her dinner that day at 6 P. M., and had eaten heartily, but of nothing that was unusually hard to digest. On the twenty-fourth she was tired from the loss of sleep and the pains of the night but was up to breakfast as usual, ate lunch by herself, and washed up the dishes. At 2:30 she was sitting on the veranda knitting quietly and apparently as well as at any time in the past month. Her companion left her for a few minutes and presently heard vomiting in the bath-room, and on going to investigate was met with the comment "Don't leave me. I think this is the end. I must have had a stroke. I have blind staggers and can't see." She was helped into a chair. The pain in the upper abdomen being too great for her to lie down. The attending physician arrived promptly but found the patient in collapse. There was a desire for the bowels to move but the finger inserted into the rectum could feel no fecal matter and nothing came away, not even gas. In the material vomited was some poorly masticated and undigested ham supposed to have been eaten the night before. Stimulation was of no avail, and morphine had but little effect on the pain. Inside of an hour the pulse had faded out completely and she died sitting in her chair, conscious to the end.

Unfortunately there was no postmortem examination to tell us just what the intraabdominal conditions were; but the history suggests a pathological course as follows: Fifteen years ago, one or more gall-stones passed into the common duct, lodging near its mouth though not permanently obstructing it, seconary inflammation of the pancreas followed which took ten years to develop to the point where glycosuria gave symptoms and was called pancreatic diabetes, subsequently there was chronic nephritis of mild but progressive type. Possibly there was a neuritis in the circumflex nerves supplying the right shoulder but more likely the pains in that shoulder were referred from the epigastric inflammation. Then four or five days before the end came there was hemorrhage into the pancreas associated with the increased abdominal tenderness so that she was comfortable only when the abdominal muscles were relaxed in the sitting posture; this produced the increased pains in the shoulder; and the blood clots in the stool. An hour before death there was probably a renewed pancreatic hemorrhage with intensification of the pain, nausea, vomiting, intestinal tenesmus, and the complete collapse. It is interesting to note the exacerbation of the symptoms at the period of pancreatic activity and engorgement with blood, as shown in the intensification of the pains in the shoulder in the evening after the heaviest meal of the day distinctly marked in the last week and still more on the last night when rather more dinner than usual was eaten, and again in the final collapse coming on one to two hours after lunch.

STONELEIGH COURT.

POSTPARTUM HEMORRHAGE.*

BY

O. HOFMANN, Jr., M. D.,
Kansas City, Mo.

In presenting this paper I wish to speak only of that form of hemorrhage in the postpregnant woman, occurring after separation of the placenta from its site of implantation. All other conditions, such as tearing of the circular artery, lacerations or bleeding due to intrauterine fibroids during the puerperium, are strictly avoided, inasmuch as such sources of hemorrhages are obviously of an entirely different category.

In postpartum hemorrhage we are dealing with an hemorrhage caused by an inefficient constriction of the uterine sinuses after separation of the placenta. Here again, to make a finer distinction, hemorrhages due to retained placental cotyledons should be excluded.

The anatomic-physiological consideration of the pregnant uterus is, I believe, of prime importance in determining the etiological factor in this form of hemorrhage.

Grossly considered, the lower segment (beginning at the ring of Bandl to the internal os) has a muscular structure which is distinct from the body of the uterus in that it possesses loosely connected muscular layers which are easily separated, while those of the corpus are inseparably interlaced bundles which can only be dissected from one another, even in the thinnest layers, by destroying the structure.

Although there is still a controversy existing as to the histological structure of the above-mentioned passive segment, and if we adhere to the view indorsed by Schroeder, Ruge, and Dittel, or that promulgated by Bandl, Kuestner, and Zweifel; nevertheless it is certain (whether the exact structure be one or another) that the contractions in this segment are feeble, both during the second and third stages of labor. Likewise, we note the same degree of sluggishness during the period of involution immediately following the completion of the third stage.

This segment is physiologically considered more or less passive as compared with the decided contractions of the rest of the uterus, and consequently I consider it of paramount importance in the etiology of postpartum hemorrhage.

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* Read before the Jackson County Medical Society, Missouri, [illegible]

The normal implantation of the placenta is high in the superior segment, either anterior or posterior. This is the active segment, and after expulsion of the fetus there is usually a partial detachment of the placenta, due to shrinkage of the placental site, and forcing down of the whole placental mass by uterine contraction. This separation continues with added contractions until it is loose. The contraction is firm, the sinuses close, and bleeding is arrested.

The lower portion of the uterine body, which has been designated as the relatively passive segment, is slower to contract and less firm in its contractions; and so if we have a placenta implanted near this zone of inactivity, as it were, we would expect from this comparative inertia a less speedy separation of the placenta and a less complete constriction of the uterine sinuses after the expulsion of the secundines, and consequently, a hemorrhage.

It is in this segment, then, that danger lurks if placental implantation takes place.

The predisposing factors of postpartum hemorrhage and placenta previa are only of degree, depending upon the site of placental attachment. If close to the internal os or over it, the resulting condition will constitute a placenta previa. If higher up, but still in the passive segment or near there, conditions become very favorable for a postpartum hemorrhage. Thus at times a placenta previa will be converted into a postpartum hemorrhage after placental delivery. In my limited number of cases, the placental implantation was invariably in the lower or passive segment.

The presumptive diagnosis of an impending postpartum hemorrhage is of the utmost importance, as it will put the obstetrician on the alert and he will begin at once to employ such medical or mechanical agents as are indicated and used in the active stage of such a calamity. Naturally, the treatment will be neither so severe nor as complicated, for it is classed as prophylactic.

It is my custom in obstetrical work where a trained assistant is at hand (or if not to do it myself) to have her reconstruct the amniotic sack as soon as the placenta has been expelled. At a glance it is possible to estimate the original site of placental implantation, namely, the distance of the placenta from the rent in the sack caused by the passage of the fetus. This will allow us to ascertain the location of the placental attachment to the uterine wall.*

If the reconstructed sack gives evidence of placental implantation having been in the passive uterine segment, it should appeal as a signal of warning to the accoucheur, for there is danger ahead. This is obvious from what has been said above in regard to the less firm constrictions of the uterine sinuses in the passive segment.

In accordance with what has been said, it becomes the obstetrician's duty to inspect his patient very closely, to linger at her side in anticipation of what may befall her, use precautionary means as outlined below, and not leave until he is satisfied that the uterus is well contracted and has remained so for quite a time.

Prophylaxis in these suspected cases consists in using the most approved methods of causing uterine contractions. An immediate hypodermic injection of aseptic ergot, the correct Credé, excitation of the mammæ, and an intrauterine douche of hot normal salt solution under strictly aseptic conditions.

The treatment of an actual postpartum hemorrhage demands speed, and every practitioner who pretends to do maternity work should be provided with the necessary means with which to combat the emergency. The case reported below with the treatment given at the time of the emergency will suffice, I believe, to illustrate the method employed in treating postpartum hemorrhage.

CASE.—Mrs. E. S., æt. twenty-three, primipara. Delivered February 8, 1909.

History of Pregnancy.—Last menstruation April 15, 1908. Some emesis for first two months, otherwise normal.

First seen January 8, 1909.

Examination.—Fetal heart rate 132. Maximum intensity 2 inches below umbilicus in line from anterior superior spine to umbilicus on right. Back of fetus on right side. Head palpated. Diagnosis, R. O. A. Urinalysis January 9, 1909: albumin, traces; sugar, negative; sp. gr., 1022; reaction, acid; indican, some.

January 30, 1909.—Urinalysis: sp. gr., 1019; albumin, traces; sugar, negative; indican, negative; reaction, acid. Blood: red blood-corpuscles, 4,655,000. Leukocytes, 10,960. Forceps delivery. Slight perineal laceration, marked cervical tear. Placenta delivered twenty minutes after fetus and perineum repaired. Reconstruction of amniotic sack showed placenta in close proximity to rent in sack. Considerable loss of blood previous to placental expulsion. Postpartum hemorrhage five minutes after placental expulsion.

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* The reconstruction of the amniotic sac was first brought to my notice by Dr. Cook, of the Polyclinic Hospital, N. Y., to whom I wish to give the credit.

Pulse thready, face blanched, marked dyspnea. Treatment: Reversed Fowler position. Hypodermic of aseptic ergot, two tubes, also strychnia 1/20 gr. hypodermically. Right gloved hand in vagina pressing on cervix, left hand on fundus with downward pressure. Also Credé. On releasing, hemorrhage renewed. Intrauterine injection of 2 per cent. solution acetic acid; quantity used, two quarts.

Uterus somewhat contracted. Intravenous infusion of normal salt solution, 40 ounces. Patient was kept in the reversed Fowler position and Murphy's proctolysis begun. A nonfebrile recovery.

February 10.—Blood showed hemoglobin, 45 per cent. Present condition, April 10, 1909: Patient still somewhat pale; red blood-corpuscles, 3,750,000. Hemoglobin, 70 per cent.

Conclusion.—Delay is fatal.

Thorough prophylactic measures on slightest suspicion of an impending hemorrhage as noted from the appearance of the reconstructed amniotic sac are essential.

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EPITHELIOMA OF THE VULVA.[*]

BY

EDWARD A. BALLOCH, M. D.,
Washington, D. C.

MALIGNANT disease of the vulva is of rather exceptional occurrence. Out of 7479 women suffering from cancer, Winckel found that the vulva was the primary seat of the disease in seventy-two, or 1 per cent. Like cancer generally it is more common in older women. The predominating type is the squamous-celled, although the adenomatous forms have been described. The medullary and scirrhus types are seldom seen, but when seen are much more malignant than the other types. As to the exact starting-point, in the majority of cases little can be determined, as these cases seldom present themselves to the observer until more or less destruction of tissue has taken place. It may develop in the labium majus, the labium minus or the clitoris, probably in the order named. In the greater labium the disease begins as a nodule under the skin; in the clitoris it has been observed as a degeneration of a previously existing wart. It is seldom that the disease appears as a tumor, owing to the fact that the older cells are destroyed by the rapid ulceration. Contact infection of the opposite labium is not infrequent.

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[*] Read before the Washington Obstetrical and Gynecological Society, May 7, 1909.

As to involvement of the lymphatics, authorities differ, the majority holding that it is of late occurrence, as compared with malignant disease elsewhere. Senn, on the other hand, contends that gland infection is early, basing his opinion on a case seen by him six months after its first discovery, in which extensive regional infection was present in both groins. The particular glands involved differ somewhat with the original seat of the disease. In cancer of the labium majus the inguinal glands are the ones chiefly involved, while in cancer of the labium minus, prepuce or clitoris the metastasis may be in the more superficial group of lymph-nodes or may appear first in the deeper pelvic group of glands. This fact is of importance in considering the propriety of operation in any given case. Owing to the free lymphatic anastomosis, cancer of a labium on one side may present involvement of the lymphatics on the opposite side.

The ulceration is peculiar in its mode of extension. Starting in one labium it will spread in an upward direction and involve successively the clitoris and prepuce, the vestibule and the opposite labium. Occasionally the mons veneris is involved. The spread is never toward the vagina and very rarely to the skin of the thigh or abdomen.

Epithelioma grows slowly, other types rapidly. Sooner or later, however, in all types, the result is a foul crateriform ulcer, discharging a thin, odorous pus.

The etiology is obscure. Some writers claim that the scratching incident to a pruritus is a determining cause, a conclusion which is disputed with great vigor by others. In the two cases herewith presented it certainly seemed to be a factor, as in both instances it had been present many years before the development of cancer. Following the rule in cancer generally, I can see no reason why prolonged irritation should not be not only a prominent factor, but the most prominent single determining cause. The atrophic changes incident to kraurosis vulvæ seem peculiarly adapted to the development of cancer.

The diagnosis is comparatively easy in the later stages of the disease. Earlier, it might be mistaken for syphilis or tuberculosis. The ring of induration always present in malignant disease should put one on his guard as to the true nature of the trouble. Syphilis occurs as a rule in younger patients and there should be present other evidences of the disease. Tuberculosis in this locality assumes the form of lupus and presents the combination of diseased and healed portions common to this affection. The thin, parchment-like scars are also characteristic. It is also more superficial. Examination of the tissue by the microscope may be necessary to a diagnosis.

Untreated the disease is fatal, generally within two years from the time of its discovery. The epithelial type is slower in its progress than the other forms. In cases submitted to operation, Butlin gives the percentage of cures as sixteen, accepting the three-year freedom from recurrence as a test.

Of course, the only treatment is operative. If the case is seen early there is every hope for a successful issue. Unfortunately valuable time is too often wasted in making a diagnosis or in experimenting with various non-surgical methods of treatment, so that the disease is well advanced before it comes to the notice of the surgeon. The only operation to be considered is the radical extirpation of the affected area, with a wide margin of sound tissue. No operation that does not include a thorough removal of lymphatic glands should be considered as radical. Hitherto the removal of the inguinal glands on the affected side has been deemed sufficient, but in view of the free anastomosis of the glands on both sides, I am of the opinion that a complete operation should include the removal of all glands whose involvement is remotely possible. The possibility, already alluded to, of the involvement of the pelvic glands makes an examination as to their condition imperative. The urinary meatus and more or less of the urethra must be sacrificed in some cases and the ingenuity of the surgeon will be taxed to devise some plastic measures to remedy the defects caused by their removal. Some operators use the cautery knife in making the dissection, holding that by its use there is less hemorrhage and less danger of infection of freshly cut surfaces by unsuspected cancer cells. These supposed advantages are counterbalanced by the slow healing of the parts and the impossibility of securing primary union. There is, as a rule, not much difficulty in securing approximation. It may be necessary to sew the edge of the cut labium to the margin of the vagina.

The following two cases may illustrate in a concrete way what has been said:

CASE I.—Mrs. M., white, widow, sixty-five years of age, seen in September, 1902. She had been a widow for many years. Her family history was negative. Her personal history was that of uniformly good health up to 1880, when the phenomena of the menopause appeared. Among the other nervous manifestations incident to that period an intense itching of the vulva appeared. For this she consulted her physician, but, through a false sense of modesty, refused to submit to the examination which he deemed necessary to an intelligent treatment of her case. Accordingly she had borne as best she could for twelve years the pruritus, which at times was very intense and caused her great suffering. There were spasmodic efforts at treatment of an empirical nature but no systematic attempts to cure the trouble. In June, 1902, she noticed two growths on the right labium majus, which increased in size during the following two months and were at times the seat of sharp, lancinating pains. The examination, in September, 1902, showed a well-nourished woman, in good physical condition. The labia minora were so shrunken as to be identified with difficulty. Both the larger labia showed patches of red, angry-looking, thickened epidermis, alternating with areas of grayish-white, atrophic tissue. The disease involved the clitoris and fourchette and extended outwardly to the sound skin of the pudendum and inwardly to the mucous membrane of the vagina. The line dividing the labia from the vagina was distinctly marked. On the right labium majus, at its upper part, was an excavated, fissured ulcer, a half-inch in diameter, with ragged edges and containing crusts of dried blood. At the lower part of the same labium was an elevated, hard red circular nodule, an inch in diameter, sensitive to touch and painful on pressure. Uterus and adnexa normal. No involvement of inguinal glands could be detected.

On September 29, 1902, the affected area was removed. The excision extended laterally from the sound skin to the mucous membrane of the vagina and perpendicularly from the mons veneris to a point between the fourchette and the anus, circumscribing the meatus urinarius. The clitoris was removed completely. The flaps came together without tension and healing was aseptic and uneventful. In February, 1903, the inguinal glands on the right side became enlarged and were removed, very thoroughly. In July, 1903, appeared a fungating mass in the right groin, deeply attached and apparently having its origin in the pelvis. In August, 1903, during my absence from the city, she died suddenly, the exact cause of her death being uncertain, but without healing of the cancer.

The obvious comment on this case is that the first operation was not complete, in that the glands were not removed. My only excuse is that I was not certain of the exact nature of the disease, one of the arguments against its malignancy being the fact that the glands were not enlarged at any time until after the operation.

CASE II.—Mrs. L., white, widow, seventy-six years of age. In this case also there was a history of pruritus vulvæ extending over many years and lately accompanied by marked irritation of the bladder and frequent and painful urination. Examination showed an ulcer involving both labia on the left side, near the center. The ulcer was an inch in diameter, angry-looking, with a mass of friable tissue in the center. Around the ulcer was a ring of induration. The ulcer involved tissue up to and including the urinary meatus. No demonstrable enlargement of glands.

Operation November 7, 1903. Removal of both labia on the left side, the clitoris and a third of an inch of the urethra, together with the upper third of the labia on the right side. Inguinal glands on both sides removed. In this case also there was an early recurrence, manifesting itself first in the urethra and resulting in the death of the patient from cancer of the bladder, in March, 1904.

In this case an earnest effort was made to remove all infected tissue and glands, but an area of affected tissue in the urethra must have escaped observation, a fact not so surprising when the locality is considered.

The lessons taught me by these two cases are as follows:

1. Irritating discharges from the uterus or vagina should not be neglected. Any chronic irritation is liable to cause cancer.

2. Pruritus vulvae calls for a careful search for its cause and its removal when found. The irritation incident to this disease may cause cancer of the vulva.

3. The earlier the operation the better the chance of cure.

4. The more thorough the operation the better the prognosis as to complete eradication of the disease.

5. Even if the disease involve only one side, the glands on both sides should be removed and an effort made to determine the condition of the pelvic glands.

6. Any involvement of the meatus urinarius or the urethra calls for careful examination of the urethra, supplemented by a cystoscopic examination.

1013 Fifteenth Street.

THE TOXEMIA OF PREGNANCY.*

BY

FRANK H. JACKSON, M. D.

Houlton, Maine.

During a conversation one day regarding the subject of the papers read before a society of general practitioners, a learned member of our profession informed me that it was very seldom he obtained anything of value from the literary efforts of the majority of his colleagues. It is therefore with a most humble spirit that I present my offering to day on this most important subject, the Toxemia of Pregnancy.

That the practitioner who has one of the graver forms of this condition to treat has far from a delectable experience in store for him, is something that you who have seen it will readily admit. Not only has he the life of the mother, but in late pregnancy that of the child as his direct responsibility.

Notwithstanding the vast amount of scientific work that has been performed by men throughout the entire world, toxemia in its various manifestations still remains a disease of theories. I shall consider the different forms of toxemia as various manifestations of one and the same disease, although I recognize the opinions of others that such may not be the case. The question of etiology and the pathological changes resulting from toxemia concern us only as it directs our attention to prevention, or if occurrence has taken place, to reparation.

Changes in the body nutrition vary in pregnancy as well as in health, but we must recognize the fact that pregnancy predisposes a woman to certain dangerous changes in metabolism.

The following are the most prominent etiological factors:

1. Disturbed functions of the kidneys.
2. Disturbance of the functions or actual death of the liver cells.
3. Autointoxication (intestinal toxemia).
4. Liberation of poisons from the placenta (disturbances of metabolism).

With reference to the latter theory, Mohr and Freund have recently succeeded in isolating from the placenta certain hemoly tic substances which in very weak solution produce hemolysis of human blood-cells. Human blood serum is capable of preventing such hemolysis, and the serum of the mother is far more effective than that of the fetus. This poison is supposed by these investigators, in some manner yet unknown, to overcome the protecting influences of the body fluids, and then, varying with the amount of the toxin in the circulation, we have the various manifestations of eclamptic poisoning. The placenta is recognized as the great intermediary organ between the mother and the fetus. The child *in utero* is dependent upon the maintainance of the functional activity of the placenta, hence it is easy to understand that the formation of toxins within and their subsequent liberation from this organ into the general circulation would be with danger to mother and child. Franklin A. Dorman, writing on the "Death of the Viable Fetus before Labor," gives us some important light which may aid to bear out this theory. Dorman obtained his statistics from the records of the Sloane, and they are particularly valuable. In 10,000 births there occurred 229 fetal deaths after the time of viability and before the birth of the child. Sixty-two deaths were from reasons not determined, but syphilis was undoubtedly the cause in some of them; syphilis was evident and probably caused the death of forty-eight, and grouped under the head of albuminuria, eclampsia and toxemia, we have forty-seven. Out of 229 deaths we have the toxemia of pregnancy in one or more forms as the cause of the death in forty-seven cases. Added to this we also have the most interesting but very important fact, that the postmortem examination of women dying from toxemia and that of the fetuses disclosed the same pathological findings. At this point we may recall the fact that with the death of the fetus *in utero* the patient suffering from a severe toxemia may experience great relief.

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* Read before the Maine Medical Society, Portland, Me., June 16, 17, [illegible]

James E. Welch, of New York, in a most able paper on the subject of Eclampsia and the Toxemia of Pregnancy gives the postmortem findings of some very important cases, and in our opinion these findings make the theory advanced by Mohr and Freund most tenable. Welch says: "The most of these cases show considerable hemolysis . . . it has been shown by experiment that hemolysis from the action of the poisons is first preceded by agglutination and fusion of the red cells before they undergo solution and give up their hemoglobin. The condition found in the parenchyma cells indicates the action of some dissolving poison . . . the perplexing aspect of the subject is the fact that under apparently similar conditions one individual will while the other will not have eclampsia. This may be explained by the side-chain theory of immunity. In one instance enough side chains are formed to neutralize the poisons while in another the capacity is exhausted and the cell destroyed."

In the cases characterized by changes in the liver we may have only a diminished activity of the functions of this organ or we may have a toxemia so virulent that the condition known as acute yellow atrophy results. When we bear in mind that the liver is one of the most important of the abdominal viscera, inasmuch as it not only renders fit for assimilation the food products, but that it renders harmless the products of intestinal putrefaction and the body waste in general, it is not difficult to anticipate a fatal termination in the case of any patient where the integrity of this viscus is seriously impaired. Normal cell metabolism is dependent upon certain enzymes, and as the liver is especially rich in these substances we see good reason for the greater liability toward autolysis here. This autolytic action is brought about by the action of certain poisons, and although the subject is still under discussion there seems to be more than sufficient reason why we should regard the placenta as the source of some of them.

The terms autointoxication and disturbed metabolism, much abused at the present day, it seems must be regarded as the symptoms of an insufficient liver. A bowel loaded with the products of decomposition and body waste in general must be a rich source for constant absorption by the tissues, and when we have added to an already inefficient liver the daily ingestion of an excess of proteid food and little or no exercise, it is not hard to estimate the end-result.

The disturbance of the renal function may arise *de novo* or we may have the lighting up of a chronic nephritis. A woman may have a certain amount of chronic inflammation of her kidneys and, until she becomes pregnant, get along very comfortably. She and her physician may be unaware that her kidneys are diseased; under the extra requirements imposed by pregnancy the kidneys may not functionate properly, and sooner or later symptoms will arise that show something is radically wrong. The acute kidney lesion occurring in pregnancy usually takes the form of an acute exudative inflammation. Some of the cases show only a slight amount of albumin in the urine, more or less headache, nausea, and perhaps a little vomiting. One, however, may have cases in which the kidney lesion is so severe that death results in a very short time. The urine will show a large amount of albumin, there will be various casts in large numbers, red and white cells showing the destructive action of the poison, severe headache, nausea, vomiting, a pulse of high tension, dropsy, convulsions. If the patient recovers the kidney lesion will not be persistent, the condition returning to normal. This fact is important to bear in mind. We should not be overanxious as to the ultimate outcome to the kidneys if the patient recovers from her toxemia.

To entertain the idea that there is any symptom or group of symptoms that is pathognomonic of eclampsia or the toxemia of pregnancy in any form would be an error. If we will but recognize the condition as one brought about by the circulation within the body of certain toxic substances, that these substances may and do cause serious changes in the parenchymatous cells of any one or of all the viscera, and that vigilance in preventing an accumulation of the toxins is not beyond our ability, we will be a step onward in preventing the late and serious manifestations of the toxic state.

The proper classification of this condition to a certain extent depends upon one's acceptance of what is and what is not toxemia. The following seems fairly well suited for clinical use:

1. Toxemia without vomiting—simple type.
2. Toxemia with vomiting—hepatic type.
3. Pre-eclamptic state.
4. Eclampsia.

While it would be ideal if pregnancy could be regarded as a pathological condition, it unfortunately remains that the pregnant woman has not been educated to the fact that she needs professional care except during the actual process of labor. A great many recent graduates enter upon practice with only a theoretical knowledge of their work. This is most unfortunate as there is no doubt but that obstetrics, as it is being elevated to-day, is becoming one of the most important branches of medicine. The surgical procedures that are often demanded make it necessary that the obstetrician be practically familiar with good surgical technic. I have no sympathy with the statement that all obstetrics should be done in hospitals. The man who knows how to obtain and, what is more important, to maintain surgical cleanliness, can successfully carry out in the average home clean obstetrics.

As in other conditions, so in the treatment of toxemia, an ounce of prevention is worth pounds of cure. With the exceptions furnished by the hapatic type of the disease, in the greater number of cases, toxemia is preventable. We may be unable to allow our patient to go to term, but if we are obliged to interfere we do so in a time far more propitious than if we commence our labors with the woman bordering on or actually in convulsions. While it may seem undergraduate advice I think the average man should watch with more care the urine of women who are pregnant. I must confess that the usual method—as it is performed with nitric acid in a test-tube—while it may be regarded by some as a procedure of merit, is almost absolutely worthless. For the estimation of albumin one can find a reliable indication by the use of Esbach's apparatus; the estimation of the urea can be conducted, minus the foul odor of bromine, with the apparatus devised by Bartley. For clinical needs both of these methods are sufficiently exact, and enable one to know what is practically necessary. Recently we have had in the literature the value of the total urinary examination advised, but it is far beyond the skill and equipment of the average man to attempt the elaborate examinations as practised by Ewing and others. Such examinations may be of value in certain cases, but the method is one that is beyond the pale of general work and we must have methods that are of value in general practice.

No arbitrary rule can be laid down as to the number of examinations one should take. Each case is a rule unto itself but what is most important is the general supervision of the patient throughout pregnancy. With little or no burden to either patient or physician, the average woman can be brought to labor in good condition. The beneficent results obtained by moderate exercise, proper food, the daily drinking of good water, and a well-acting lower bowel are well known to us all. If we have a patient whose kidneys we know to be the seat of a chronic nephritis, or if we entertain a suspicion that all is not right, there is no doubt but that we can obtain valuable aid from examination of the eyes. It is beyond dispute that a serious kidney lesion can exist and not be disclosed by our ordinary methods of examination and yet become certain from evidence obtained in the optic fundus.

Toxemia without vomiting is usually a transitory affair, and in the majority of instances is nothing more than the result of the absorption of poison form a loaded colon. We usually find that these patients are indolent, they have taken little or no exercise and have eaten heartily of heavy foods. Treatment is usually simple and is prompt in bringing about relief.

Toxemia with vomiting varies from cases of a mild type to those of the most severe. Under the first group we have the so-called morning sickness. That this is a form of mild toxemia is doubtless probable and, although it usually constitutes only an inconvenience, it may be present in so severe a form that it assumes grave proportions. Usually we are not consulted about the mild cases as the woman regards it as part of her lot. In those we are obliged to treat we try the giving of food before arising, the administration of drugs by the stomach, of which cerium oxylate, carbolic acid, bismuth, chloroform and peppermint-water are the most commonly used, combined with measures to assure a free acting liver and clear large intestine. In some we obtain a measure of relief, in others none. A slight dilation of the cervix, painting the cervix with either cocaine or silver nitrate is said to have been of service in some neurotic cases. If the vomiting and nausea becomes so severe that the woman is rapidly running down hill one must empty the uterus. One should not determine upon so radical a procedure until a fair trial has been given to other means, and on the other hand it should not be put off until the patient is *in extremis*. In the cases of the hepatic type there seems to be no way of diagnosing the disease in its incipiency. So far as I can learn it is regularly fatal when it has progressed beyond a certain point and it then makes no difference whether we empty the uterus or not. Whatever the poison is or wherever it comes from its action upon the liver is rapid and most destructive. I have seen two cases and both resulted fatally.

The pre-eclamptic and eclamptic cases are seemingly the most common. In the majority of instances the patients are suffering from an acute exudative nephritis, the intestinal tract is loaded and if left untreated or treated improperly they may die. In the mild forms one will find more or less albumin, there may be a few casts, headache, some nausea and toward evening a slight edema of the feet and ankles. The graver cases present a picture that is known only too well, but experience has shown that many of these woman can be brought to labor at term and be delivered of a live infant. The patient who is in the pre-eclamptic stage should be put to bed at once under the care of a competent nurse if possible. A thorough cleansing of the intestinal tract should be accomplished first. An enema of two ounces each of a saturated solution of magnesium sulphate, turpentine and glycerine, given by means of the high tube, will materially aid in cleaning out the lower bowel. It should be followed by calomel and podophyllin and salines in appropriate doses. Lavage of the stomach in case there is severe nausea or vomiting will be of more service than the administration of drugs. The daily use of hot saline by the rectum is another measure that should not he omitted, but in cases complicated by edema care should be used not to flood the heart. The use of saline subcutaneously or intravenously in the dosage indicated will often be of value. For the pulse of high tension one will find veratrum either in the alkaloid or the tincture one of the most valuable drugs that we possess. Aconitine and nitroglycerine are also of value in keeping up the dilation of the arteries. The diet of the patient is another thing of great importance. The rule is to give these patients milk, but I have found that they do much better with absolutely nothing but water for two or three days. Milk is not as digestible as one might think in these cases, and starvation will be of great benefit. With the subsidence of the graver symptoms we can begin feeding by using the cereal gruels, buttermilk, koumiss, and the light broths.

If we see our patient for the first time actually in a convulsion, or if our efforts in the pre-eclamptic cases have not been of much value in giving relief there is but little use in wasting our time or endangering the life of the woman with palliative measures. It is beyond dispute that the uterus should be emptied in these cases as soon as is consistent with the individual case. That the emptying of the gravid uterus is an operation of magnitude must be evident, and he who attempts it for the first time believing that an hour of pleasure is in store for him may bitterly repent. As in other branches of our art, so in obstetrics, fools often rush in where angels fear to tread, and although I would not occupy your time in describing the preparation of either patient or operator I think we are all agreed that one should use the most scrupulous surgical cleanliness. While it is advised that the child be delivered as soon as possible that does not mean that it should be dragged from the uterus despite any and all obstacles that may exist. We must remember that our patient is suffering from a severe toxemia, and the least we can do is not to add to her burden. There seems to be throughout the country a rage for the delivery of infants by the method of vaginal section. Gentlemen of at least great surgical enthusiasm, have gleefully seized upon the eclamptic woman as another subject for the exploiting of their operative ability. Not long ago I read a most able article describing this operation but was much surprised to see that the author advised that the general practitioner perform this operation if necessary. It hardly seems advisable that one who has not had a good training in vaginal work should attempt an operation of this magnitude if other methods of value are available. Those of you who have read Dr. Peterson's article, "The Indications for and The Technic of Vaginal Cesarean Section" in *Surgery, Gynecology and Obstetrics* of February, this year, must have been impressed with the clearness of his views as he expresses them. Regarding the distinguished author's ability to perform the operation of vaginal section or his judgment as to when it shall be done I do not question but I do question seriously that this radical and major surgical procedure can be of value to the average general practitioner. The chief indication for the operation, as given by other writers, is a rigid cervix and where, owing to danger to both mother and child, the uterus must be emptied rapidly. In this connection we take form a paper by Dr. Miles F. Porter the following opinion: "In eclampsia in the primipara, with a viable child, Cesarean section was the best method of delivery usually. With a capacious pelvis and vagina, Duhrssen's operation might be preferred." In regarding the serious dangers that confront the operator, who is making his début into obstetric surgery, we must remember that the cervix is not the only barrier to the rapid extraction of the child but we have a vaginal canal that is unprepared to meet its obligations, also a perineum that is more or less unyielding. Unless the operator makes his incisions correctly extraction may cause a severe laceration of the uterine wall. The dense unyielding perineum may be seriously torn, and there are of course the ever present dangers of sepsis, hemorrhage, injuries to the bladder and rectum. I cannot but believe that if an operation is required to save the life of mother and child the average nan will do better by the abdominal method. With due care his chances for an aseptic operation are better than if he uses the vaginal method and with much better chance for success. Either of these operations must be indicated rarely. As my friend Dr. F. O. Hill says, "We should not commit surgical rape." Fortunately nature in an attempt to aid the woman, in the majority of cases, starts uterine contractions and we have more or less softening of the cervix. If we are able to commence the operation of dilatation manally we should do so, but if not, the use of the mechanical dilator is called for. I recognize that much has been said against the use of the mechanical dilator, but if one will exhibit intellectual as well as muscular effort in his usage of the instrument less harm will result than if energetic but misguided efforts with the scissors or scalpel are indulged in. The Bossi instrument is one seldom found in the average equipment. but there are several others whose use is often of the greatest value. If we would regard instruments as aids, not as means, to accomplish an end despite nature's protests against the assault, one would hear or read less of the "accidents" that happened. They are not always accidents. They are the result of ignorance as to the proper use of the instruments in the large percentage of cases. When one is called to determine why the efforts of a colleague with forceps are of no value and finds to his surprise that instrument applied upside down he is more or less at a loss to explain how such efforts could be regarded as scientific.

The dangers during a convulsion are far from theoretical. The liability to serious cerebral hemorrhage and cardiac paralysis is very great and we must endeavor to control them as far as possible. Chloroform has been and is now regarded by all as the agent most efficacious, but the question arises, are we justified in its use; is it as beneficial and as valuable as we are wont to believe, and is its use free from danger both remote and present? In view of the fact that chloroform has been conclusively shown to be a substance that may cause death by its action on the liver should we not be careful in a disease like toxemia of adding any more load to this often-diseased organ? Newell strongly recommends the use of morphine and hyoscine. We have found this combination most valuable, and its use should be more universal. Hyoscine is certainly a cardiac depressant, but action of the blood-vessels in overcoming the spasm offsets the depressant effect. Its use should be attended with care, but this is true of any and all drugs. The sedative effect of morphine and hyoscine Newell maintains with chloral until he is satisfied that excretion is freely established. Venesection to the amount of ten to thirty ounces is another measure one should not neglect, and it is often of value in cases where the tension in the blood-vessels is not high. Sweating a patient by pilocarpine and hot packs is not as valuable a procedure as one might think. The woman will sweat if we overcome the vasoconstriction for her and the dangers liable from the use of pilocarpine offset its value.

In conclusion we should make a plea that our efforts in behalf of the pregnant woman commence as soon as possible after pregnancy has taken place. If toxemia occurs we should regard it as a most serious complication and treat it accordingly, and that treatment consists of:

Stopping the input of the poisons;
The removal of their source;
Their removal from the body;
The minimizing of their effects.

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TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY.

Meeting of June 25, 1909.

The President, HENRY F. LEWIS, M. D., *in the Chair.*

UTERUS WITH FIBROIDS.

DR. EMIL RIES.—This uterus, with some fibroids, was removed this morning. The interesting feature is that it contains a subserous fibroid the size of a walnut, and that this subserous fibroid presented the only adhesion to another organ, the omentum. Now, when there are adhesions, we assume that there is a cause for them, and that cause is generally inflammation, and when we speak of inflammation involuntarily nowadays we assume that the cause of the inflammation is infection. In this case, however, there is no history of infection. The tubes and ovaries were normal. There was no closure of the tube, and no adhesion around the tubes or ovaries. Why should this fibroid have caused adhesion of the omentum when the rest remained free from adhesions? I looked for a solution of the riddle in the fibroid, for the same reason for which I looked upon the solution of a similar riddle in a case I operated on a month ago. A woman had fibroids weighing 11 3/4 pounds, which I removed. Twelve tumors could be palpated from the outside. When I operated on her, of the twelve tumors which could be palpated from the outside, two showed adhesions of the omentum and the rest were free from adhesions. Why did these two have adhesions and the others not? In cutting through these two fibroids, it was found they had undergone necrosis and infiltration with calcareous material. The fibroid removed to-day shows the yellow color of the degeneration, and there are points in this yellowish material showing calcareous degeneration. As I have stated, there was no history of infection in this case. We know that these fibroids undergo this degeneration without any infection, and this observation may serve to throw light on the formation of adhesions, which are still discussed in so many different ways. It seems to amount more to a chemotactic action of the necrotic material upon the omentum—a chemical action which allures and binds the omentum to these parts—than to an infection.

DR. HENRY F. LEWIS read a paper entitled

CERVICAL CESAREAN SECTION.*

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* For original article see page 586.

DISCUSSION.

Dr. Rudolph W. Holmes.—The usual trouble with the classical Cesarean section has been not enough regard for peritoneal cleanliness. Too commonly Cesarean section has been done by men who are not sufficiently versed in abdominal work, and therefore either the uterus is incised *in situ*, or perhaps delivered through the abdominal wound and then the child delivered without walling off. The proper and complete walling off of the uterus robs Cesarean section of a great deal of its danger. I believe the danger of hemorrhage is less with the abdominal than with cervical Cesarean section. I have seen about sixty Cesarean operations in this country and in Europe, done by all kinds of operators, those who have had the greatest experience, and those who have had only one case and perhaps had never seen one done before they undertook it. In that time I have only seen one postpartum hemorrhage during the operation. Hemorrhage was always immaterial in the so-called placenta previa Cesaria. I think the opening of the lower portion of the abdomen, exposing all the cellular spaces, is going to be a fruitful source of infection, even in a clean case, from the inevitable slight contamination from the bacterial flora of the cervix. The danger is greater, in that a number of germs are liable to enter the connective-tissue spaces, where the bacterial resistance is lowest. Again, when we consider the proximity of that incision to the cervix, and the close proximity to the lochia, which so quickly becomes infected, there is a good deal of chance of the lochial germs infecting these tissues and causing trouble. Dr. Lewis spoke of the risk of upper segment adhesions to the abdominal wall, but this, to my mind, is less disagreeable in its after-effect than where the cervix becomes adherent and retroversion of the uterus develops. From what Dr. Lewis has said, and my own *a priori* reasoning, I would be loth to undertake this operation, particularly in an infected case.

Dr. Channing W. Barret.—I have had no experience with cervical Cesarean section. My experience in the few cases in which I have done the classical Cesarean operation would lead me to think that the great danger of hemorrhage from that route has been somewhat overestimated in the hands of one who is doing abdominal work. Theoretically, I might say, that while there may be some advantage in making an incision low down, yet, it seems to me, it is more than overbalanced by the disadvantage. Without experience to back it up, I was very glad to see that the conclusions of the essayist were rather against cervical Cesarean section, and preference being shown for the transperitoneal classical operation, because, it seems to me, for anatomical and physiological reasons, and the very fact during the sewing and manipulation where we make this cervical incision, we are working in a field where we are most apt to have infection, to say nothing of the increased danger of injuring the bladder. The logical conclusion to arrive at would seem to be that we should adopt that operation rather sparingly.

Dr. Gustav Kolischer.—While we may theorize a good deal in regard to the operation that has been described by Dr. Lewis, I do not think we are justified in condemning it entirely, because, in the first place, the statistics of the operation are too small. In the second place, a great many of these cases ended unfavorably because they were unfavorable to start with. Theoretically, I cannot see any more danger from incising the cervix in the manner described and doing the classical Cesarean section, provided the infection is confined to the lower uterine segment. One theoretical point of great value brought out by Frank is in calling attention, as quoted by Dr. Lewis, to the great difference in mortality between complete and incomplete rupture of the uterus. As a matter of fact, if we infect the peritoneum to any extent, especially during the puerperium, we know we cannot influence the peritonitis if it develops at all, and when once developed, there is great danger of its spread. If, after more cases are operated on by this method, it turns out that the statistics are more favorable from the standpoint of recoveries than the classical Cesarean operation, then I can see no good reason why we should not resort to it. Once in a while the cervix may become so attached that retroflexion results, but that is not of such great consequence. One point is very remarkable, and that is, the men who have had great obstetric experience and a large experience in operative work, and whom we may consider conservative, are inclined to take up this operation.

Although I do not believe in doing an operation blindly, still some good reasons have been advanced in favor of this operation. Operators are not absolutely satisfied with the results of the transperitoneal operation, because infection of the peritoneum, when it once occurs, can hardly be stopped. In bladder operations we know that if we can keep the peritoneum intact, it never becomes infected, while after it is once opened and sewed up, there are cases on record where general peritoneal infection has followed. Furthermore, the danger of infection taking place in the precervical space has been very much overrated.

Dr. Lewis (closing the discussion).—The later operators, especially Latzko and others, have improved their technic, which, theoretically, seems to be better than some of the earlier ones. The theory that Frank started out with was that we must protect the peritoneum from infection, because there is no way of stopping a virulent infection; then he goes ahead and opens the peritoneum, closing it up again, it is true, but, as Latzko says, it is a difficult matter to sew the peritoneum "bacteria-tight." Of the majority of operations done, it has only been in the later operations, such as those done by Latzko and Doederlein, that the peritoneum has not been opened intentionally. If, before the separation of the peritoneum, holes are made in it, although at once sewed up, then that method ceases to be an extraperitoneal operation. Therefore the earlier operations were not extraperitoneal, although all of them were cervical operations. Some of them designedly opened the peritoneum. Latzko, in his cases, has not torn the peritoneum. We must realize that we do not have a very large space in which to open, and one has to grasp and pull the child up in an irregular kind of way, not as we would through the normal passages. There are not a sufficient number of cases of Latzko's modification, which is truly extraperitoneal, for us to judge as to the ultimate results. Of course, we cannot compare it very well with the classical Cesarean operation, for the reason that the latter in the great majority of clinics is considered to be contraindicated when there has been a chance of previous infection.

I have brought this subject before you to try to crystallize it a little, because the German literature, especially in the last year, is full of it, and so I have made an attempt not only to present the literature of the subject to you, but to try and sift it a little, with the result that personally I am rather unfavorably impressed with this operation, and will need more evidence in its favor before I would recommend that it be done.

Dr. Emil Ries read a paper entitled

POSTOPERATIVE PROLAPSE OF THE INTESTINES.*

DISCUSSION.

Dr. Alexander Hugh Ferguson.—I am very glad that Dr. Ries brought this excellent and admirable paper before the Society. I presume every surgeon has had experience with a number of these cases. While I have not counted them, I have had at least half a dozen. I can recall a number of cases that might have been prevented by different suturing and better treatment of the wound, that is, not to remove the sutures too soon nor to use suture material that becomes absorbed too rapidly. I have also mapped out in my own mind and in my practice the class of cases that are liable to be followed by prolapse of the intestines after operations. Men are more liable to its occurrence than women. Women who have born children are less liable than those who have no children, because the abdomen is more tense in these people. It is more liable to occur in men above the umbilicus. It is more liable to occur in a fat abdominal wall, particularly in a woman who has had no children. It rarely follows operations for the removal of large tumors or large cysts from the abdomen. I had it follow in one man for a simple exploration, carcinoma with ascites, and I have had it occur in a woman with carcinoma and with ascites. In the man the wound would not heal at all until the ascitic fluid was drawn off at another point. This was a case of carcinoma of the stomach. Naturally, I drained suprapubically, but the wound did not heal until I removed the fluid. That is in keeping with our experience of gastroenterostomy and other operations upon the stomach where there is ascites due to carcinoma. In the case of the woman a median incision was made below the umbilicus. The wound would not heal. The sutures were removed on the eighth day, and the intestines came out on the skin. We resutured, but the ascitic fluid continued to come away. Eventually, I drained through Douglas' pouch before I obtained union of the abdominal wall, so that is one class of cases, and that is the proper way to deal with them.

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*For original article, see page 569.

I have had it occur in two children who were very anemic, where the sutures were removed too soon, and although there was perfect coaptation and perfect union, the abdominal wall being firm, the children were evidently too feeble to get repair within the usual time. That is a feature that has to be considered in connection with these cases. In most of the cases, prolapse of the intestines occurred after the removal of the sutures on or about the eighth day.

I saw two cases in consultation that were exactly like those Dr. Ries has reported. There was an enormous amount of serum, without counting where it came from, which is a suspicious symptom of prolapse of the bowel between the muscles. It may be partial or complete. In all these cases I think we ought to use a suture material, if we use it layer by layer, that will hold for a couple of weeks at least, in some cases three weeks or more. I still use, in addition to layer by layer, in a number of cases where I am suspicious of prolapse taking place, the button suture, through-and-through suture, with double silkworm-gut, and put the button far away from the wound and through all the structures except the peritoneum, taking it far out in another direction, and getting these tied together and leaving it in a week or more. The quill suture will do just as well. In secondary operations, where we know everything is very tense, we can do plastic work to prevent this prolapse of the intestines.

I recall two cases of prolapse of the intestines into the vagina after hysterectomy, where, after the drainage had been removed, one woman began to vomit and vomited for twenty-four hours or more, and a knuckle of bowel was found strangulated. This operation was done at the time when we used clamps. In another clamp operation the intestines came down very nearly to the knees of the woman. In this case the clamp and packing were removed too soon. These patients recovered by washing the intestines, putting them back, and keeping them there.

DR. DANIEL N. EISENDRATH.—My experience is limited to one case of my own and to one case of a colleague. In my own case prolapse of the intestines occurred on the tenth day after a laparotomy for pyosalpinx. It occurred without any warning, the edges of the wound giving way completely, all the edges, including that of the skin and coils of intestines, being found by the interne under the dressings. The second case was one in which the entire structures of the wound gave way in the same manner as in the first case, and the coils of intestines were found under the dressing. This was a case of general peritonitis occurring in the service of one of my colleagues.

With regard to the manner of reposition, the greatest mistake we make is to try to break up the adhesions which exist between the adjacent coils of intestines. The entire mass of intestines should be replaced *in toto*. In my judgment, when we break up adhesions it is akin to doing an amputation through infected territory, in that we open up lymph channels which will take up infection in the peritoneal cavity especially, which will spread. We should not break up these adhesions, but gradually replace the intestines back in the abdominal cavity, dissecting off the edges of the wound and resuturing it. If I did not have any other means, I would be content simply with gradually drawing the intestines back into the abdominal cavity and holding them there by means of adhesive plaster.

As regards the condition of the edges of the wound, to which Dr. Ries has referred, it seems to me that the condition he describes with smooth edges is rather an effect than a cause. He speaks of it as being a new condition, but I think it is similar to what we find quite frequently in cases of hernia. The hernial ring is smooth, and worn away the same as in this condition, which is practically a hernia, but only of more recent origin. The edges are smoothed by the pressure of the coils of intestine. The membrane formation is comparatively simple to explain, in that we have a fibrinoplastic exudate which takes place over the coils of intestines. If we consider the manner in which wounds heal, it seems very feasible that we should expect such a prolapse of the intestines to occur more frequently than it does. If you will permit me to go into an elementary phase of the subject, I will say that the healing of a wound takes place early by the formation of loops of granulation tissue, and these granulation tissue loops are organized by fibroblasts, which take the place of the young connective-tissue cells, the organizatiou taking place with the connective tissue. If we have a patient whose healing powers are below par, this prolapse of the intestines is very apt to occur in women who have born children, whose muscles are flabby and fat. We find the same condition in people with hernias in whom the general systemic conditions do not favor healing, who are not going to have connective-tissue formation sufficient to hold their wounds when any stress is put on them. For that reason, I believe we are going to adopt, in our method of getting patients up early after operations in median laparotomies, a middle ground. The pendulum has swung too far in the direction of patients getting up on the third, the fourth, or the sixth day after operations, and the reason postoperative prolapse of the intestines has been more frequent in the past is that we do not give the connective-tissue organization sufficient time to take place to form resistance.

Another point is with reference to the method of suturing.

I now make it a rule to follow the method of F. T. Murphy, of Boston, who has experimented on dogs, and has found that the most ideal method of union of wounds was to suture layer by layer. This method is being pretty generally adopted. A great many of us are apt to rely too much on catgut, and the catgut gives way too soon. You know it only takes forty-eight hours for nonchromicized catgut to be absorbed by the young connective-tissue cells of the parts and by the wandering cells. In using chromicized catgut we can depend upon it for eight or ten days. In my laparotomy work I suture each layer separately, and put in a reenforcing suture of silkworm-gut or waxed silk, the suture going down not through the peritoneum, but to the peritoneum. First of all, we suture the peritoneum in a median laparotomy, then the rectus muscle, then the anterior sheath of the rectus, which is one of the most important structures of the abdominal wall, then the skin, and before this the separate sutures are tied, or the skin sutures may be tied after the through-and-through sutures are brought up and tied.

Another point I would emphasize is overlapping, as mentioned by Dr. Ferguson. We do not rely upon this enough. Where we operate for a ventral hernia, for instance, we have, as frequently occurs nowadays, a patient brought to us with a ventral hernia who has been operated on previously by somebody else. We have to operate for two conditions, and we must make more use of the overlapping fascia. We must adopt the suggestion of Dr. Andrews as indicated in the imbrication method of hernia, that is, taking the anterior sheath of the rectus and the external aponeurosis layer, using an overlapping suture and making two thick layers where ordinarily we only have but one.

Dr. Channing W. Barrett.—This question of dealing with the abdominal incision is a very important one for us as surgeons. There are two classes of cases particularly that have been mentioned and with which we have to deal. The first is that class of which Dr. Ries spoke, in which rupture takes place immediately, or soon after operation from the giving way of the sutures. Here there is undoubtedly a disproportion between the strength of the suture and the force exerted upon it, as from coughing, vomiting, straining, or in some way increasing the intraabdominal pressure, putting a greater strain upon the suture than it is able to bear. I would say, that this kind of rupture depends a great deal upon the suture material used, contrary to what Dr. Ries is inclined to believe.

Then we have another class of cases in which, no matter what kind of suture material is used, and no matter how long the suture material stays in, when it is taken out the wound is found unhealed. I recall one case seen in my early work with Dr. Newman in which a woman who was operated on for carcinoma, whose vitality was so low that no healing took place in the abdominal incision, and at every point where a hypodermic injection was made there was necrosis of tissue. There was no tendency whatever to healing. In cases in which wounds do not heal after the sutures have remained in place for some time, it may be from an inherent lack of a tendency to heal, or there may be a little septic material in the wound, or an accumulation of a little blood between the layers as we have had occasion to observe.

Along the line of the cases which Dr. Ries has reported, with regard to rupture taking place early, I have seen in the last year two cases in which rupture took place early through the layers up to the skin, and the skin having a little more rapid healing powers than the other tissues did not rupture, and in which slow intestinal obstruction took place in one case. The patient had severe vomiting directly after the operation. She vomited for the first two days, and on the second day she said to the nurse she felt as if something had given way in the abdominal wall. It is not uncommon to hear patients say that, and the nurse took very little notice of it. The patient, however, made a good recovery, left the hospital, and a few days after leaving the hospital her husband brought her a large apple, and she showed her appreciation by eating all of it. After eating this apple she began to have a severe pain in the abdomen, followed by vomiting, then fecal vomiting, and I was called by her physician and surgeon to see her. The intestine could be palpated directly under the skin. Upon opening the abdomen I found a knuckle of the intestine in the incision adherent to the skin. Upon opening the bowel we found the apple-sauce-like material filling the bowel for several feet above the place where the bowel was obstructed in the wound, and some of the same material below the wound, showing that the obstruction had not been complete for a time after the process had lighted up. The intestine had become so adherent to the inner surface of the wound that it was difficult to tell where the abdominal edges left off and the intestine began. In dissecting it out, there was an opening made through which we could remove the intestinal contents. The patient had partial obstruction farther down which was freed. We closed the opening in the bowel, but the abdomen had to be reopened the next day, and complete obstruction found when the intestine was fastened to the abdominal wall and left open, and the patient made a good recovery, the wound in the intestine subsequently closing spontaneously.

In the other case, seen some few weeks ago, the surgeon used tender catgut, the wound gave way, and the patient came to this city, having been operated on in Iowa, and when she arrived there was considerable bulging. A little opening could be found through the aponeurosis, and then under that we discovered at the time of operation the recti muscles had separated widely, or rather the two portions of the right recti muscle had separated widely, allowing a large portion of the viscera to protrude between the muscles, there being only a small hernia between the edges of the external oblique.

Dr. Thomas J. Sullivan.—During my professional life, both as an assistant and as operator, I have seen but one case of prolapse of the bowel, and that one Dr. Ries has referred to. These cases can be divided into two classes, those in which the abdominal wall opens and the bowel passes out through the skin, and those in which there is a partial giving way some time after operation, when a ventral hernia occurs. The fatalities seem, from what I learn in conversation with others, to be due to infection from improper management. In my own case the patient was suffering from carcinoma of the stomach, for which I did a gastroenterostomy. That patient did not get up too soon, but laid in bed two weeks, on her back all the time. She vomited frequently. That might be a factor. Three causes are enumerated, namely, vomiting, sneezing, coughing. This patient vomited very hard, and she coughed considerably.

Dr. Ries states he has two or three times observed, soon after operation, rupture of the walls with an audible noise. I have observed the same thing. A patient whose abdominal wall I was closing vomited on the table before the skin was closed completely. The rupture was audible. The skin sutures were removed, and it was found the catgut had ruptured. In another case the woman was in bed two weeks. The suturing was layer by layer—peritoneum, fascia, then skin. The skin sutures were removed just before she went home, at the end of two weeks. My recollection of the case is that the interne telephoned to me and reported that the patient was going home; that he had removed the sutures carefully, had sponged the skin with alcohol, and put on a tight laparotomy pad as a precaution. In a short time the patient's husband informed me that the patient complained of moisture in the wound. I removed the adhesive plaster, lifted up the pad carefully, and found the intestines protruding. They were dropped back into the abdominal cavity. The patient was removed to the hospital and the wound reclosed. Recovery was uneventful.

It is most important if the accident occurs, not to handle the case in any way until the environment can be made surgically clean. If possible, the patient should be sent to the operating-room, when everything will be clean, and the intestines can be replaced without danger. Death in these cases is due to infection.

Dr. Carl Wagner.—I have been very much interested in and instructed by Dr. Ries' paper.. I have no doubt that postoperative prolapse of the intestines occurs much more frequently than we have supposed. I believe I am able to report a case that supports the theory advanced by Dr. Ries, that by placing the sutures in exactly the same straight line, severing of the fibers of the fascia and of the muscles may take place or, as he states it, a cleft form through which bowel may prolapse.

Some twelve years ago I operated a short built woman who weighed three hundred pounds. I had closed the abdominal wound very carefully in layers with heavy silk, keeping in mind the enormous intraabdominal pressure that would be brought to bear upon the sutures. The skin sutures comprised all layers except the peritoneum. On the second day after the operation the patient developed a bronchopneumonia, the onset of which was accompanied by a sudden sharp pain in the right lower lobe of the lung and a sensation of bursting of the abdomen. On my arrival at the hospital a few hours later I found the patient with the characteristic respiration, temperature, and pulse of pneumonia. The pain in the abdominal region had disappeared. I accepted that this had been a projected pain from the lung complication at its onset and therefore did not deem it necessary to disturb the dressings of the abdominal wound. But when it was inspected a few days later, I noticed a tumification to the right of the line of suture. I interpreted this as a blood or serum extravasation and thought best to treat it as a noli-me-tangere, trusting it to absorption. The patient complained only twice of a sensation of nausea on the first day of the beginning of this complication. The swelling gave the patient no trouble whatsoever; but it remained the same size. The removal of the stitches brought no change. Auscultation and palpation at that time disclosed the fact that the tumor represented bowel situated directly under the skin. During the following year this tumor grew gradually in size so that the patient had the hollow metal plate, which she wore under her abdominal supporter as a receptacle and protection for the protruding mass, substituted by increasing larger ones. A year later I operated. I found all the silk sutures encapsulated. There was a thick, firm scar throughout all layers in the suture line absolutely intact; but about an inch from the suture line a cleft through all the layers for about three inches permitted the bowel to protrude directly under the skin.

Since I have listened to Dr. Ries I believe that it was due to the accuracy with which the different sutures were placed on the same line through the fascia and muscles that tended to weaken the resistance of those tissues which gave way to form the cleft when the cough paroxysms came to bear forcefully on the enormously large abdomen.

Dr. A. Belcham Keyes.—This is a very important and timely subject which Dr. Ries has brought before us, especially with regard to the earlier getting up of patients after laparotomy. So far as rupture of the sutures and prolapse of the intestine is concerned after laparotomy, I would like to say something on the other side. Some four or five years ago I had a case in which suppuration of the entire abdominal wall with giving way of all the sutures occurred, with the exception of the peritoneum. What Dr. Sullivan said in regard to getting a good seroserous coaptation of sufficient width is right. This patient's wound was resutured with good results after the suppuration had subsided. We should use good catgut and sufficiently heavy and tie the sutures interruptedly and with a surgeon's knot. Frequently the tying of these knots is left to the assistant, and time and again I have seen knots slip and have often spoken of the necessity of practising tying knots. Another point is not to cut off the suture too close to the knot. A case that I operated on for a large umbilical hernia two or three months ago at the Cook County Hospital is also interesting in this connection. There was considerable difficulty in dissecting the hernia out and avoiding infection from the ulceration of the skin over the hernia. The fascia was imbricated by the method advised by Mayo. Suppuration took place in this case and each layer gave way from the skin down to the first layer of interrupted sutures put in, which included the fascia and peritoneum (which were so united that it was impossible to separate them). Every day I went to see the patient, thinking that at any moment there might be rupture of the last layer, but it did not give way, and the patient has made a good recovery without recurrence of the hernia thus far. In closing abdominal wounds the fascia should be closed with its muscle surface to muscle surface, or if imbricated, the fat on its upper surface should be wiped away thoroughly; again it is very necessary to recognize the fascia itself and not sew fat to fat, a mistake that I have seen made.

I believe that the surgical knot, which has been so much maligned recently, will again be rigidly adhered to. Through-and-through sutures of silkworm gut are not entirely satisfactory. Heavy silk, dipped in something so that it will not allow it to act as a drain, is far preferable to silkworm gut. Silkworm gut cuts the tissues and becomes loose, so that the strain is on the catgut. Taking out the sutures too early I believe is wrong, and for the last three or four years I have left them in for fourteen days; and so far as the weakening of the abdominal wall is concerned, I have watched my cases for a period of a year afterward, to see if there was the slightest sign of weakness, and there has been no evidence of it. I believe if we pay more attention to the details of applying sutures, these cases of postoperative prolapse of the intestines will not occur so frequently as they have in the past and as mentioned in the literature.

Dr. Ries (closing the discussion).—Acquaintance with the literature does not seem to be as general as I had thought, for some of the statements which the gentlemen made would not have been made if they had taken advantage of the literature on this subject. If a gentleman tells you that it is important to use this, that, or the other kind of suture method or suture material, he does not know what the literature says, and what any gentleman may say about his impressions derived from five or six or ten cases, may be, proves nothing, as long as we have a hundred and fifty-seven to prove the contrary. It is not very important to use a suture material which lasts two weeks if that suture material bursts the first twenty-four hours. After it has burst it makes no difference whether it would have lasted ten days or two weeks, if it had not burst. And not only catgut, but silkworm-gut and silk sutures give way.

As far as replacing the bowel without suturing is concerned, that is an excellent method. Madelung reports a number of such cases where the abdominal walls were not sutured; the intestines were held back, and the abdominal walls pulled together with adhesive, etc., and some of the patients in whom this was done did very well. They did not even get hernias.

The pathology of this condition interests me immensely, and I have been in the habit of looking at these things through the microscope myself, and I am trying to get away from the mistake of using the mystic expression "healing powers below par," which I have heard mentioned as an important factor to-night. Also, I have tried to see young connective cells which have absorbed catgut, but I have never been able to find them. It is also news to me that there is fibrinoplastic material on the intestines. On the contrary, in the cases which I have mentioned and seen, and in those mentioned in the literature and which are unmistakable, there was no exudate, neither fibrinoplastic nor otherwise.

As to the similarity with hernia, there is a fundamental difference instead of a similarity. The similarity exists in favor of the opening, and the fundamental difference exists in the fact that the one has a peritoneal lining and the other has not. The wearing away of tissue beneath the peritoneum in hernia has nothing to do with the formation of granulation tissue in the ruptured wound itself.

I was not surprised to have the method of allowing patients to get out of bed early brought into the discussion, but it has nothing to do with the case. The 157 patients whose cases I reported from Madelung's paper did not get up early, but they had rupture of the abdominal wall just the same. I have reported to you three cases which had more or less trouble. The method of getting patients up early after operations is rather young. I have used it only twelve years. I published it ten years ago. There are men here who have followed the method, and there are hundreds in Europe who have done so and are doing so, and it has not been reported that the cases that got up early have more prolapses of the intestines than other cases. The three cases which I have reported to you have occurred in over eight hundred laparotomies which I have done in the last fifteen years, if I calculate that I have had fifty a year (certainly a moderate estimate), so that the percentage of postoperative prolapse of the intestines is not great, and early getting up of patients after operations has nothing to do with it. The bursting of sutures took place long before the patients got up That, according to this theory, takes place within an hour or so after operation. I have given you proofs which show that this bursting of the deep layers does not take place at the moment the intestine falls out. I have proven to you by the description of the beveled edges of the abdominal incision that this must be an old condition; that it must occur earlier than we used to think. There has not been anything adduced to contradict this observation which is new. There is only one reference to it in the literature by Neermann, to which he paid no attention himself because he did not understand its importance.

There is one way of preventing postoperative prolapse of the intestines, and that is the way which I am testing now. Usually, when we take out the stitches in the skin we are careful not to handle the wound any more than is really necessary. We generally do not touch it at all; we take out the stitches with instruments; therefore we do not know whether that suture is firm or not. But it is an easy thing to do this. Have the patient lie down; place your hand, covered with glove or a piece of sterile material, over the incision, have the patient raise the hips, and possibly, if there is much infiltration under the skin, you cannot feel whether the scar is firm or not. But if there is separation of the muscles, if the fascia has given way, if the stitches have ruptured underneath, then nothing holds but skin, and if you have the patient raise up after the stitches are removed you may feel that there is nothing but the skin. That is a simple thing and may save you a great deal of trouble.

I thank you very kindly for the discussion you have given this paper.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of April 2, 1909.

The President, I. S. STONE, M. D., *in the Chair.*

DR. G. BROUN MILLER presented a specimen of

UTERUS WITH TUBE AND OVARY REMOVED DURING THE MENSTRUAL PERIOD.

An unmarried woman of thirty years, a patient of Dr. Z. T. Sowers, was seen by me ten days ago. She is a post-office employee, and complained of hemorrhages at her menstrual periods with dizziness, shortness of breath, weakness, slight disturbance of digestion, and slight swelling of the feet and ankles. She looked markedly anemic and her blood examination showed hemoglobin 30 per cent., red cells 4,000,000, leukocytes 6,500. The pelvic examination showed a fibromyoma of the uterus; the tubes and ovaries appeared normal. Examination of the heart showed a loud rather harsh systolic murmur heard most distinctly over the left second intercostal interspace but heard less distinctly over the whole cardiac region. The heart was not perceptibly enlarged. The subclavian and carotid arteries especially upon the left side showed very visible pulsation and the murmur could be heard indistinctly in them. A slight nervous hum could be heard over the jugulars.

The pulse was regular, of weak quality with a rate of 110 to 120 beats per minute. The examination was otherwise negative.

She was put to bed, given food at frequent intervals and iron in large quantities. Her hemoglobin in eight days had increased to 50 per cent., and as she had yesterday the premonitory signs of menstruation, *i.e.*, the discharge of a considerable quantity of blood-stained mucus *per vaginam* and her usual pelvic discomforts which precede the flow, I operated this morning.

The conditions found at operation were to me so interesting that I report the case. The peritoneal cavity in its lower portion and the pelvic cavity contained a considerable quantity of serum stained by the dark blood as is seen in cases of ruptured tubal pregnancy. There were no blood clots to be seen however, and the amount of blood was much smaller than is usually seen in such cases. Both tubes were markedly distended with this same dark fluid blood, they being as large as the average pus tube, measuring nearly an inch in diameter at their largest portions. The fimbriated end of the right tube was closed, being as you can see in the specimen adherent to the ovary. The fimbriated end of the left tube was open but the mucosa of the tube looked swollen and slightly inflamed. The uterine cavity contained besides the fibroid a considerable quantity of this same dark blood. The left ovary showed a freshly ruptured follicle and the right ovary a small cyst. The body of the uterus with the right tube and ovary were removed.

The case presented to me several interesting conditions to which I wish to call your attention. Were the distended tubes filled with menstrual blood which regurgitated from the uterine cavity or did these tubes take an actual part in menstruation, contrary to what the physiologists tell us? The blood of menstruation is supposed to come only from the uterine mucosa. The closed tube in the right side and the slightly swollen one on the left; did these indicate that it is this regurgitated menstrual blood which produces many of the adherent and inflamed tubes which are so common in fibroid tumors of the uterus?

The heart condition was to me interesting also. I believe it to be a hemic murmur. She took the anesthetic well, and her pulse was slower and fuller at the end of the operation than I have felt it since I first saw her.

The rapid increase in hemoglobin was interesting also as in eight days it increased from 30 to 50 per cent. As it was first taken at least one week after the end of menstruation the percentage of hemoglobin immediately after the period had perhaps been considerably lower than 30 per cent.

DISCUSSION.

DR. CARR asked whether it was possible for menstrual blood to be forced into the peritoneal cavity causing dysmenorrhea and peritonitis.

DR. ABBE said that a study of the tube would be very interesting. If the uterine ends of the tube were closed the blood in the tubes must be of tubal origin and show that the tubal mucosa participated in the menstrual changes. On the other hand, if the tubes were open at that end unless the mucosa of the tubes was degenerated nothing would be proven since the uterus in this case seemed especially favorably constructed on account of the peculiar location of the fibroid to force the uterine contents into the tubes.

DR. W. M. SPRIGG read the essay of the evening on

VAGINAL CESAREAN SECTION*

with the report of four cases.

DISCUSSION.

DR. MORAN in discussing the paper said that vaginal Cesarean section was one of the most valuable recent additions to obstetrics. The chief indications in his mind were eclampsia, toxemia and stenosis of the cervix. The objections urged against the operation were rupture of the bladder and peritoneum, infection, hemorrhage, and rupture of the uterus. The first could be avoided by careful technic and an incision four to four and a half inches in length sufficient to admit easily the fist. Even if the bladder should be opened it could be sutured without bad result. The risks of hemorrhage and infection were no greater than in other forms of operative delivery. The danger of subsequent rupture of the uterus at another labor was not serious as the only twelve cases in which a subsequent normal labor had been reported had all been uneventful, which was not to be wondered at since the lower segment of the uterus is normally passive and dilates while the upper segment of the uterus does the contracting. There had been reported two cases of postoperative death of the women in the District of Columbia.

DR. FRY agreed that the operation was one of the most valuable advances made in years, but noted that it was not favored by the text-books or by the profession in general. One of the fatal cases reported in this city was undertaken in a woman already moribund and should not be called a death from the operation. He did not think it an appropriate procedure in placenta previa. In placenta previa the danger from hemorrhage was much greater either ante- or postpartum due to incomplete removal of the placenta or laceration into the placental site.

DR. CARR thought that eclampsia cases should be treated by either the classical or the vaginal Cesarean section. That dilatation of the cervix did not give the prompt cessation of the convulsions that followed the more prompt removal of the child. He had done his second Cesarean section on the same patient two weeks ago. One point in favor of the vaginal section was the absence of adhesions after the operation. As contraindications to the operation he considered cancer of the cervix, pelvic masses, and obesity.

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* See original paper, page 606.

Dr. Sothoron asked if there was any difficulty in the delivery of the placenta after the vaginal operation.

Dr. Wall had a patient with marked hypertrophy of the cervix in whom he anticipated great trouble from dilatation at the first stage of labor. He asked if that could fairly be considered an indication for vaginal section.

Dr. Fry had had one case of marked obesity in which he had done a vaginal Cesarean section and had taken but six minutes for the extraction of the infant and twenty for the closure of the wound.

Dr. Miller said that in cancer cases he thought the abdominal route certainly gave a much better exposure for the radical removal of the uterus that was indicated. He thought that in dilatation of the cervix complete manual dilatation was not usually feasible, the final dilatation being done by the head of the child and the forceps and the child paid the penalty. He spoke of the danger of cystitis from separation of the bladder from the uterus.

Dr. White asked how much hemorrhage followed these cases and whether there was any later disturbance of the pelvic organs. He suggested injection of colored water into the bladder before ending the operation to determine the possible existence of laceration of the bladder.

Dr. Sprigg said that the placenta could be expressed by the usual Credé method. As to the amount of hemorrhage, in only one case was there bleeding enough to need gause packing to control it before the sutures were introduced. He said that two of his cases had been women each weighing over 200 pounds so that that degree of obesity was not a contraindication. As to the postoperative gynecological history one of his cases had had a miscarriage from accident one year after operation but that was the only gynecological complication of which he knew.

Meeting of April 16, 1909.

The President, I. S. Stone, M. D., *in the Chair*.

Dr. A. F. A. King read the paper of the evening on

THIGH PRESSURE IN LABOR*

DISCUSSION.

Dr. J. T. Johnson in discussing the paper agreed with Dr. King that meddlesome medicine was always bad practice. He thought that the attempt to follow natural courses had led to the modern type of labor and the treatment of the cord that led to its drying up without infection. He thought that thigh pressure was an important factor in labor, and cited a case of difficult labor where preparatory to the application of the forceps and anesthesia the patient got out of bed and kneeled at its side to say her prayers whereupon she promptly delivered herself. He also remembered another case where there had been a transverse presentation, one of the arms projecting. Under treatment the uterus was ruptured and the intestine prolapsed. Following that, however, the child was delivered and the mother recovered.

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* Paper not received.

Dr. T. C. Smith did not agree with Dr. King in any particular. Dr. King would return to the ways of nature, but the tying of the cord was no injury if it subsequently was treated properly and kept dry. The frequency of vaginal examination was not harmful providing it was done with perfect asepsis and it certainly was most valuable. The squatting posture during labor was natural only to those having no beds, and thigh pressure could not be more effective than pressure with the educated hands of the accoucheur. He thought that Dr. King's theories needed confirmation by case experience.

Dr. Stone said that Dr. King often was able to foresee things that the rest of us had to wait for. It was not justifiable to draw any conclusions from a few cases, and as yet it did not seem appropriate either to adopt and practise Dr. King's tenets untried or to deny them fair trial. In animals the value of thigh pressure was not shown but it was known that the squatting posture did change the angle of the sacrum in relation to the rest of the pelvis and such a factor might be an aid in delivery.

Dr. Sothoron did not understand that Dr. King would abandon operative treatment in indicated cases but only in normal conditions where nature could be made to do more work than was expected of her.

Dr. Prentiss called attention to the fact that Dr. King's suggestion of the thigh flexed position was just the opposite of that recommended by Walcher and that it might well be of great value in certain cases.

Dr. Cook did not understand that a claim had been made for thigh pressure as a cure for all obstetrical troubles but only that it would save some complications.

Dr. Sprigg thought that flexion would modify pelvic diameters and that thigh pressure was useful in the late stages of labor.

Dr. King had not considered any deformity or abnormal pelvis conditions. He had recommended thigh pressure especially for transverse presentations. Here he would have the patient squat with that foot forward which was on the side of the breech. The marked thinning of the lower uterine segment in protracted labor he thought would be avoided by the squatting posture which tended to press the uterus together. The squatting posture also would tend to obviate the troubles arising from a short cord, and many of the forceps operations.

Meeting of May 7, 1909.

The President, I. S. STONE, M. D., *in the Chair.*

DR. BALLOCH read the essay of the evening

EPITHELIOMA OF THE VULVA.*

DISCUSSION.

DR. MILLER spoke of the rarity of the condition as a primary growth, though it was not so uncommon after cancer of the uterus. The involvement of the glands was usually extensive on account of the rich vascular supply of the vulva. For the cure of the condition some comprehensive and systematic removal of all the possible glands and as much of the bladder and urethra as necessary should be tried, but he knew of no classical description of such an operation.

DR. VAUGHAN had had one case of primary epithelioma of the vulva starting in the right labium majus in a woman fifty years of age. He did an extensive operation, removing all of the labium majus and the inguinal glands on that side, but the growth recurred inside of a year. The nearest approach to a classical operation was that described for the penis cases, with eradication of all the external genitals and inguinal glands and bringing the urethra out on the perineum just in front of the anus.

DR. STONE cited a case of primary cancer of the clitoris and showed a drawing from a microphotograph of a section of the tissue. When first seen the clitoris was eaten away and the labium majus involved. No involvement of the glands could be made out. Inside of a year recurrence followed the first operation and a second radical operation was done, removing all possible glands in the inguinal and femoral regions but not the pelvic glands. In another year there was again recurrence in the femoral region which had again been removed. No recurrence in the subsequent year had yet appeared. In this case there was no pruritus. Recently he had seen a case of primary cancer of the vagina under the urethra which had not come to operation.

DR. ABBE called attention to the similarity between epithelioma of the vulva and that of other parts of the body. The contact growths on the two labia were simular to the appearance of the multiple growths in epithelioma of the face. He cited one case that seemed to point distinctly to the infectious nature of the disease where a patient with epithelioma of the eye developed epithelioma of the ear on the same side and one or two small epitheliomatous patches on the cheek of the same side later, while the opposite side of the face remained practically clean. This he interpreted as a case of infection by the hand from the eye to the ear and the face. The fact that the second growth appeared at a distance from the eye and on an isolated part with terminal vessels seemed to point strongly to an external infection and not a spread through the tissues to the secondary focus. Another point of similarity with the epitheliomas of the skin in general was the slow involvement of the glands. In view of this general similarity and the remarkable good results from the treatment of epithelioma by radiotherapy he took issue with the essayist on the point of treatment and thought that radiotherapy deserved a distinct consideration and ought to offer as good results if not better than operation. Epithelioma of the skin in general was cured in 90 per cent. of the cases by radiotherapy, and if anywhere near one-half as good results were obtained in the vulval cases it certainly should not pass unmentioned.

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*See original article, page 634.

DR. BOVEE said that he discredited the statistics of the radiotherapists. The most hopeful results and the most hopeless were those that were written up. He thought it very doubtful if 90 per cent. of the cases of epithelioma were cured. He had had twelve cases of epithelioma of the vulva operated on, none of them cured. The last was an involvement of the vestibule and clitoris in a woman of twenty-five years and had been diagnosed tuberculosis and syphilis before operation. It had been removed by cautery which caused considerable disfigurement, but he thought offered the most hope. He did not think the condition curable after a few months of growth. No radical operative procedure seemed justifiable, and so he did only palliative operations.

DR. WHITE took exception to the term infection as used by Dr. Abbe and thought that the case cited showed an implantation rather than an infection.

DR. STONE said that the society would be glad to have some of the cases of cured epithelioma presented.

DR. BALLOCH in closing said that he had reported the case in fear and trembling because the patient had died, but no one else seemed to have done any better. He thought that prevention of vulval irritation offered the best line of treatment in preventing the occurrence of the disease. He did not believe that any radical operation would be practical. He doubted the efficacy of radiotherapy and still thought the knife would give better results.

Meeting of May 21, 1909.

The President, I. S. STONE, M. D., *in the Chair.*

DR. J. WESLEY BOVEE presented a specimen of

MUCOID OR HYALINE DEGENERATION OF UTERINE FIBROMA WITH TWISTED PEDICLE.

M. J., colored, widow, forty years of age, was admitted to Columbia Hospital, May 18, 1909, suffering from metrostaxis. Her only pregnancy ended with the normal birth of a living child in 1888, and she has been a widow since 1897. During the past five years the menstrual periods have increased in duration, sometimes lasting more than two weeks and have been irregular as to frequency, varying from three weeks to more than two months. The last period was from May 2 to May 18. She has suffered considerably with pain in the right lower quadrant of the abdomen at the menstrual periods. At times it extended down the thigh. An examination revealed the cervix higher than normal and the pelvis filled by a mass of fibroids practically fixed. Above this mass which extended well up out of the pelvis was a rounded, smooth, freely movable mass about four inches in diameter, the movement of which in an upward direction beyond the umbilicus seemed to be limited by an attachment. It seemed to be freely movable in all other directions. Hemaglobin, 50 per cent. On opening the abdomen this morning by an incision extending from the pubes to above the umbilicus, the last-mentioned mass was easily brought through the abdominal opening and appeared to be attached to the top of the uterus a little behind the right tubouterine junction. The mass was purple in color, very soft, nonadherent, and its pedicle was about two inches in length, slightly conical in shape, and at the end attached to the uterus, had a diameter of about one-half inch. It was about as soft in consistency as was the tumor. Another growth fairly dense was attached to the anterior wall of the uterus and was about three inches in diameter. It was of the subserous variety. The largest growth was one developed from the posterior wall of the uterus and extended down into the culdesac to which it was quite firmly adherent. It was of about the size of the head of a full term fetus. The tension on the round and upper portion of the broad ligaments was unusually great. The tumors and the body of the uterus were therefore removed by clamping and severing the right broad ligament close to the uterus, separating adhesions in front contracted with the bladder and parietal peritoneum, cutting through the cervix from right to left and severing the left broad ligament in a manner similar to that of the right except in the reverse direction. On account of general and very dense adhesions of the appendages a right hydrosalpinx was but partially removed. The ovaries were practically unrecognizable and left in the woman. The tumors were now bisected, and it was decided to remove the cervix which was done. Thick gauze was lightly packed in the pelvis and one end pushed out through the vagina with a uterine sound. On opening the pediculated tumor there was at once an escape of about two ounces of thin bloody fluid from the portion farthest from the pedicle. Complete section of the tumor showed the remainder of it to be nearly gelatinous in appearance. The pedicle was soft, and during manipulations of the tumor before removal of the specimen from the woman it was several times twisted and untwisted from one to two complete revolutions. The largest tumor was very dense, being apparently a typical fibroma. The tumor springing from the anterior wall of the uterus was much softer, apparently containing more muscular tissue, and undergoing degeneration.

The specimen is interesting by reason of the following points: 1. Degeneration of the pediculated growth. 2. The existence of a pedicle to that growth permitting its easy rotation with a consequent twisting of the pedicle, a phenomenon rarely observed. 3. The unusually severe adhesions of the appendages without a history of pelvic peritonitis.

Dr. Carr spoke of the cause of pedunculation as primarily contraction of the uterus.

Dr. Abbe described a case of pedunculated fibroid in which the pedicle also was extremely small and the fibroid so freely movable that before opening the abdomen the diagnosis had been movable kidney, since the fibroid was the size and shape of a normal kidney and the pedicle so long that the mass could be pushed up under the ribs.

Dr. Stone remarked on the frequency of disease of the appendages in fibroids.

Dr. Wood suggested that the rotation of the fibroid might be due to the filling and evacuation of the bowel which would displace the pelvic masses on the left side.

Dr. Bovee in closing said that in this case the mass with the twisted pedicle had been outside of the pelvis. In many cases there was found associated with fibroids disease of the appendages without history of pelvic inflammation. This might be because the inflammation occurred years ago and had been forgotten or that the pelvic inflammation was set up by the fibroids. But not one-third of the cases of fibroids in the series of 5,000 cases reported by Noble were associated with disease of the appendages.

Dr. Truman Abbe presented a paper on

PANCREATITIS.*

Dr. Vaughan thought one of the main lessons to be learned from the recent studies on pancreatic inflammation was not to allow patients with symptoms of gall-stones to go without operation. Small stones lodging in the papilla of Vater acted as ball valves, and while not giving jaundice did lead to infection of the pancreas. The cases of pancreatitis were not so commonly found but were recognized by Robson and Moynihan. He had had three cases of acute pancreatitis all of which had died: one on the table; one an hour later, and the other not much later. Of his chronic cases all had gotten well after drainage of the bile-ducts. He had had one peculiar case in a man sixty-four years of age who had been in good health except for mental trouble. He had had four attacks at intervals of about two months each with abdominal cramps, but no vomiting, until the last attack which was also accompanied with diarrhea. The skin was sallow but not jaundiced, and there was some fever. There was an ill-defined mass below the liver to the right of the navel which was tender and suggested stones in the gall-bladder, ulcer of the duodenum, pancreatitis or appendicitis. At operation the gall-bladder was found contracted and surrounded by adhesions, and there was an abscess behind the duodenum in the head of the pancreas. It contained about a half-pint of chocolate-colored pus. There was fat necrosis of the omentum and peritoneum. The gall-bladder contained pus and calculous material. There was no evidence of obstruction of the common duct.

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* See original article, page 621.

Dr. Borden said that inflammation of the pancreas was taking the place occupied by appendicitis some twenty years ago. Then appendicitis was not recognized much oftener than pancreatitis is now. Cammidge and Robson claim that about 58 per cent. of all cases of gall-stones are associated with pancreatitis as found on postmortem examination. The Mayos found pancreatic disease by palpation at operation in 19 per cent. of all gall-stone cases, but many cases of pancreatitis are not shown by gross lesions. Pancreatic disease must be expected and looked for whenever gall-stone symptoms are found. Chronic pancreatitis may exist without gall-stones so that even after the gall-stone colic is over, if the pancreatic symptoms persist, there is still need of operative drainage of the gall-bladder. Jaundice occurred in two-thirds of all cases of pancreatic disease, for in that per cent. the common bile duct ran through the head of the pancreas. The presence of diabetes in disease of the pancreas should always be looked for, but the cases of pure pancreatic diabetes did not run as rapid a course as other types. He had seen one case of acute pancreatitis with a sudden onset of violent epigastric pain going through to the back, not to the right shoulder. There was collapse, and the diagnosis of acute intestinal obstruction was made before operation. But on opening the abdomen there was found arterial and venous engorgement and edema around the head of the pancreas. The colon was elevated and a large cigarette drain inserted. The patient recovered.

Dr. Carr said mild grades of pancreatitis were fairly common and that the absolute differential diagnosis was not necessary as all the similar conditions needed operation. The drainage of the gall-bladder on the skin was the operation of choice.

Dr. Wood suggested that as the presence of the bile in the intestinal secretion doubled its efficacy so when the bile was forced into the pancreas and there mixed with the pancreatic secretion that there was an increased digestion of the epithelium of the pancreatic duct, and hence the tendency to hemorrhage. He thought that every case of gall-stone needed operation, if the stone was left in the persistent irritation tended to produce cancer. He said that the case operated on by Dr. Vaughan in which the biliary tract had been found normal and an ectopic pregnancy discovered now appealed to him as one of secondary pancreatitis. The patient had had another attack simulating gall-stone colic, and examination of the urine showed a positive

Cammidge reaction. The patient was now taking urotropine, but had not been operated on again.

Dr. Wall had seen one instance of acute pancreatitis in which the patient had lain in collapse without any palpable radical pulse for three days and asked if that was common in these cases.

Dr. Abbe in closing said that the collapse of these acute pancreatic hemorrhage cases was extreme and the low blood pressure might easily make the pulse impalpable at the wrist for some time but did not know that there was anything peculiar to pancreatitis in the long pulseless stage. In regard to Dr. Wood's case the evidence seemed to be increasing in favor of the diagnosis of pancreatitis and operation was certainly indicated. The use of urotropin was probably as reasonable as any form of medication since it was known to sterilize the bile.

REVIEWS.

New York Association for the Blind. Special Committee on Prevention of Blindness. Children Who need not have been Blind. Prevention a Public Duty. January, 1909.

This short pamphlet has been issued in the hope of again calling attention to the fact that *one-quarter of all the blind children in all the blind schools of this country are unnecessarily blind.* Apparently not only ignorant midwives have been at fault, but also members of the medical profession. When so simple and inexpensive a measure as Credéing is all that is required, our mission appears not only incredible but warrants legal action for negligence. The committee's action in striving for public education, cooperation of medical societies, and adequate legal measures is to be warmly indorsed and encouraged.

R. T. F.

Abhandlungen aus dem Gebiete der Geburtshilfe und Gynakologie. Mitteilungen aus der zweiten Frauenklinik der Königlichen Ung. Universität zu Budapest. Heraus gegeben von Prof. Dr. W. Tauffer, Direktor der Klinik. Band I, Heft. 1. Octavo, pages 304. S. Karger, Berlin, 1909.

This report begins with an article by *Tauffer* upon the advantages of conservative *vs.* radical operation in uterine myomata, based upon 756 cases. After carefully reviewing this material and showing that severe menopause symptoms may be looked for in 30 per cent. of the cases after radical operation, and that nearly 20 per cent. of women who have had myomectomies performed conceive after operation, the author yet confesses (just as *Winter* has done) that he is an advocate of the radical operation.

Tóth reviews the operations for bladder and other vaginal fistulæ performed during the last twenty-five years embracing 158 cases, some of them of great interest.

Scipiades discusses rupture of the uterus (ninty-one cases), concluding that nonoperative treatment is preferable in both the incomplete and complete variety. R. T. F.

BLUTUNGEN UND AUSFLUSS AUS DEM UTERUS. IHRE URSACHEN UND BEHANDLUNG. VON HOFRAT DR. A. THEILHABER. Octavo, pages 87, with 9 illustrations and 4 plates. Price, 2.50 marks. Ernst Reinhardt, München, 1909.

This interesting monograph contains the gist of Theilhaber's studies which have appeared scattered through the literature for the last ten years or more.

The author draws attention in the first place to the great physiological variations of all parts of the normal uterus during the various periods of life—infancy, puberty, puerperium, climacterium and old age; secondly, to the theory that the duration and amount of hemorrhage is dependent upon the muscular sufficiency or insufficiency of the uterus. During infancy and senility the musculature is least developed, the vessels have the smallest lumen; during the childbearing period both muscles and vessels attain their maximum. Such uteri as contain much connective tissue and little muscle readily become hyperemic and are unable to perform their function properly during menstruation. Uterine myomata cause hyperplasia of the muscle fibers and therefore no bleeding occurs unless the fibroid develops submucously. At the onset of tubal trouble the uterus is soft and hyperemic, later connective tissue develops, causing "myofibrosis," both conditions naturally favoring an increase of bleeding. Increase of connective-tissue growth is a regular preclimacteric change, while hypoplasia of the musculature is common in young chlorotic girls, who in addition often produce vascular engorgement by onanistic practices. It will be seen from the above that Theilhaber ascribes all menorrhagic or metrorrhagic troubles to disproportion between vascular and muscular constituents of the uterus. He furthermore denies importance to *diffuse* endometrial changes, the sclerosis of the blood-vessels, to ovarian hyperactivity, etc., and to pelvic inflammations unless a great increase of the pelvic blood supply is directly caused by the latter trouble. Local conditions such as polypi, carcinoma and sarcoma naturally can produce hemorrhage. Nervous influences may affect the menstrual function by either raising or lowering the general blood-pressure, causing local vaso dilatation, etc.

Leukorrhea is produced by hypersecretion from the uterus in venous stasis, metritis, circulatory disturbance due to psychical or erotic causes, chlorosis, etc., by true endometritis, almost invariably of gonorrheal origin.

The treatment advocated differs but little from that generally accepted and practised. Considerable efficiency is ascribed to intrauterine applications of zinc chloride or formaline. In chronic gonorrhea application of silver salts is advised. Of course general measures, change of climate, baths and douches are also recommended.

This monograph, based as it is upon many years of clinical and laboratory investigation, well merits careful perusal; and though perhaps further study may show that all uterine hemorrhages may not exactly conform to the author's classification, these explanations are by far the most satisfactory thus far advanced. R. T. F.

NEW-WORLD SCIENCE SERIES. HYMAN PHYSIOLOGY. AN ELEMENTARY TEXT-BOOK OF ANATOMY, PHYSIOLOGY, AND HYGIENE. By JOHN W. RITCHIE, Prof. or Biology, College of William and Mary, Virginia. Small octavo, pages 362. Illustrated by Mary H. Willman. World Book Co., Yonkers, 1909.

This little book is satisfactory because it states elementary facts in a clear, concise and connected way. Without confusing the pupil, a careful study of its pages will render him familiar with the essentials of the three sciences dealt with, and will also impress him with the great practical value of their daily application. The tobacco and alcohol questions are discussed fairly and without exaggeration. The concluding chapters on germ diseases are of particular value. R. T. F.

LEHRBUCH DER SPECIELLEN PSYCHIATRIE, FUR STUDIERENDE UND AERZTE. VON PROF. DR. ALEXANDER PILCY. Zweite verbesserte Auflage. Leipzig und Wien, Franz Deutike, 1909.

This book is written according to the classification and teachings of the Vienna School of Psychiatry. The work is intended to serve the needs of the general practitioner, and therefore only such data as will appeal to his interest are introduced. The author has eliminated all the general features of the subject, pathological anatomy and (surprising for a Teutonic book) all references to the literature. The author plunges directly into the discussion of the psychiatric diseases, and pays special attention to symptomatology, differential diagnosis and therapy. The text is lucid, the exposition interesting and the therapy is far from nihilistic. It is a book which can be cordially recommended for the purposes for which it is intended. E. M.

BIER'S HYPEREMIC TREATMENT IN SURGERY, MEDICINE, AND ALL THE SPECIALTIES: A MANUAL OF ITS PRACTICAL APPLICATION. BY WILLY MEYER, M. D., Professor of Surgery at the New York Post-Graduate Medical School and Hospital, and PROFESSOR DR. VICTOR SCHMIEDEN, Assistant to Professor Bier at Berlin University, Germany. Second Revised Edition. Octavo of 280 pages, illustrated. Philadelphia and London, W. B. Saunders Company, 1909. Cloth, $3.00 net.

This book was manifestly written as a popularizing measure, and the authors have left no stone unturned to achieve this end.

Anything that savors of the abstract or of theory has been cast to the winds; the exposition is short and nicely systematized; there are plenty of well-executed and enticing illustrations, and finally the virtues of the methods which they advocate are extolled with a flourish and a glamor that would make an advertisement blush with modesty. Bier's methods do not require such ecstatic phrases to gain disciples; on the contrary the unequivocal enthusiasm which the authors display throughout their pages will only arouse a feeling of distrust to any one with a critical bent of thought. Indeed, it can already be safely said, without entering too largely into the question of the merits of hyperemia, that, in dispassionate hands, the results obtained are not nearly as brilliant as those which the authors claim to have seen. In fact, reports, both verbal and published, are creeping to this country which indicate that even in Europe, where hyperemia has been tried on a far more extensive scale than in this country, and where the enthusiasm at is inception reached well-nigh delirious limits, this therapeutic agent has lost much of its prestige and has been abandoned in many conditions in which at first it was thought a *sine qua non*. However this may be, it cannot be denied that hyperemia is of value and that its field of utility is even a very wide one. We believe, however, that the authors would have done greater service to the cause of hyperemia had their views been expressed more temperately.

The book is neatly gotten up, despite extensive padding, and affords an exceedingly attractive aspect. It is unfortunate that the authors did not avail themselves of some competent person to revise their English. It is full of German idioms, bad grammar and wretched phrasing. E. M.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Interpretation of the Porro Uterus in Relation to the Third Stage of Labor.—D. Berry Hart (*Edin. Med. Jour.*, June, 1909) discusses the theories of the mechanism of the third stage of labor. The arguments against the theory of separation of the placenta by direct shrinkage of the placental site are that it has been acknowledged by its chief advocates that the placenta does not separate at a shrinkage to 4″ x 4″ and it has never been demonstrated that a greater shrinkage than this occurs. The writer holds that when a pain has died off, the elasticity of the muscle, and especially of the interpenetrating elastic tissue, asserts itself, and we get the softer, bulkier uterus, and, above all, an increase in area of the apposed internal uterine surfaces, the two surfaces sliding on one another without separation. This increase in area is not participated in by the nonvascular, nonelastic placenta, and thus we get the disproportion between placental site and placental area, and the tearing of the spongy layer. This occurs after each pain, until at last, when both membranes and placenta are thus separated, the uterus, gathering itself up, as it were, expels the placenta according to Schultze's or Duncan's mechanism, which are really mechanisms of expulsion but not of separation. As regards the bearing of this theory upon the management of the third stage, he says that the latter may be conducted in two ways. In the first method the attendant grasps the uterus firmly, brings on pain by friction if he thinks the uterus sluggish, and reinforces each pain by pressure. This is the active method introduced by Credé. In this way the third stage may be shortened, but the practitioner will find that he has hemorrhage, and occasional retention of membranes with all their unpleasant sequelæ. If the upper edge of the placenta is at the Fallopian tube angle, he may perhaps expel the placenta and membranes, *minus* a piece of the placenta the size of the tip of the finger, and this piece may become septic. The second method is to keep the hand permanently on the uterus, wait for pains, and not to compress the uterus unless there are indications for it, the main one being hemorrhage. The size of the uterus should be noted, and only when its bulk markedly diminishes, indicating separation, should gentle expression of the uterus or pressure in the suprapubic region, according as the placenta is in the lower uterine segment or in the vagina, be employed. This method goes on the theory that the placenta is separated ofter the pain, that hand pressure will not separate it safely at the time, and that the safe time to use hand grasping is after the placenta has separated.

First Three Weeks of Pregnancy and Relation to Ectopic Gestation.—James Phillips (*Practitioner*, June, 1909) gives an outline of recent discoveries in regard to the early development of the human ovum. The fertilized and segmented ovum reaches the uterus while it retains the dimensions of the unfertilized oöcyte and while the future embryo is represented merely by a thickened band of cells. The ovum, having reached this stage of development, becomes capable of burrowing into the thickened uterine mucosa and sets up a process of coagulation necrosis in the tissue surrounding it. It thus excavates a cavity whose size corresponds with that of the rapidly growing ovum. The maternal vessels are opened into, and the extravasated blood nourishes the ovum, and later circulates in the primitive placental sinuses. When the nourishment of the fetus has been assured by the mingling of maternal and fetal tissues, the distinctive changes cease and embryo, placenta, and uterus grow steadily. In ectopic gestation the same burrowing of the ovum occurs, but it is into the thin tubal wall or occasionally the ovary itself. The cause of delay of the ovum in its passage toward the uterus long enough to allow it to reach the stage of development at which it begins to burrow into the epithelial tissue with which it happens to be in contact is not positively known. Though kinks, adhesions, polypi, etc., have been found in the tube, in many cases no obvious cause of the delay is found. The ovum having begun to imbed itself, a tubal pregnancy may eventuate in four different ways: (1) growth may proceed without rupture of the tube; (2) rupture may occur after placental formation is well advanced, and the fetus may escape from the tube, while the placenta retains its tubal attachment; (3) intraperitoneal rupture may take place before the imbedding stage has been completed, and (4) intratubal rupture may occur at the same early stage.

Missed Labor.—Peter McEwan (*Lancet*, June 26, 1909) records a case of missed labor accompanied by flooding eight months after the last menstruation and followed by an offensive vaginal discharge for ten weeks. After dilating the cervix, the fetus was decapitated and removed. A perforation of the uterus then being found, a median abdominal incision was made. The uterus was found to be large, flabby, necrotic, and adherent to the intestine. Its wall was not much thicker than stout brown paper except where the placenta was attached and was found torn in several places. The organ was removed with pieces of necrotic omentum. Death occurred fifteen hours after the operation. No reason for the missed labor was found.

The Blood in Incoercible Vomiting of Pregnancy.—Louis Devraigne (*L'Obstet.*, May, 1909) finds it stated by Tuschkai that when blood examination shows the presence of megaloblasts, and a diminution of the red cells in cases of incoercible vomiting of pregnancy, we must at once perform abortion in order to save the life of the patient. After citing the blood formulæ of several cases observed at the Lariboisière, the author says that there is not a true polycythemia due to new formation of red blood-cells, but that the condition is relative, due to concentration of the blood, with a parallel increase in hemoglobin from the dehydration of the system which is produced by vomiting and inability to retain anything in the stomach. In benign cases there is a slight diminution of the cells, which is not a globular anemia. In serious cases in which injections of serum are not made there is a normal blood-cell formula and the prognosis is good. In cases in which there is no special treatment and the woman shows polycythemia the prognosis is very grave.

Ovular Theory of the Pathogenesis of Eclampsia. E. Opocher (*Folia Gynecologica*, Vol. II, Part 2, 1909), after a careful examination of the various arguments, theoretical and experimental, for the causation of eclampsia by the poisonous products of the ovum, gives these conclusions: that the ovular theory does not find support in experiments or in clinical observation sufficient to substantiate it as the cause of eclampsia. To consider the eclamptic poisons as products of the fetal metabolism is contrary to the physiology of obstetrics and common observation, and the placenta is not capable of neutralizing these poisonous products in cases of physiological normal pregnancy. Although the placentar theory is attractive from a theoretical point of view, it is not proven practically by clinical observations or experiments. Finally, setting out with the fact that there is a marked nervous excitability in the pregnant woman, the theory of maternal antitoxins is the one that most easily satisfies the interpretation of the clinical facts in the morbid condition, and that is founded on modern doctrines of organic metabolism in general, and of pregnancy in particular.

Inertia after Delivery.—Voron and Gonnet (*Réunion Obstét. de Lyon*, May 25, 1909) report several cases of a sort of inertia of the uterus occurring immediately after delivery and lasting from one to three hours, without much hemorrhage, but with symptoms of collapse. This inertia is absolute and begins abruptly; the hardened uterine ball having been felt a few minutes before, the practitioner finds that the patient is flowing and the uterus is entirely relaxed. The general symptoms of shock are so urgent that the physician seeks every means of causing uterine contraction. Hot douches have very little effect; ergot causes no contraction, and only manual massage with one hand within the uterus and the other on the abdomen has any effect on the relaxation. When contraction does begin it comes for short periods with intervals of relaxation, the latter becoming gradually shorter until contraction is complete and permanent. On the following day the patient seems little the worse for her serious experience. A peculiarity of this form of inertia is that it recurs in the same patient in different labors. It seems to have something to do with disagreeable emotions, such as attend the putting in of sutures in the perineum.

Treatment of Postpartum Hemorrhage.—O. V. Herff (*Münch. Med. Woch.*, June 15 and 22, 1909) discusses the treatment of postpartum hemorrhage when the ordinary means of producing contraction, such as ergot and hot applications, fail. The number of deaths from complete uterine atony is considerable. The causes are of several kinds; changes in the blood which lessen its coagulability; changes in the musculature of the uterus which prevent effective contractions; changes in the walls of the blood-vessels which hinder their contraction; changes in the tissues around the uterus, such as peritonitis; anomalies of position of the placenta rendering a portion of the walls less contractile; functional changes which weaken the musculature. Henkel's method of compression of the abdomen may be of use in a few cases. A valuable method of exciting contraction is rubbing and kneading the uterus with one hand within and the other without the uterus on the abdomen, and compression of the uterus against the pubic bone. The aorta can be compressed against the spine, leaving the lower portion of the body bloodless. The tampon advocated by Dührssen is of doubtful value. According to its originator, it acts as a foreign body, compressing the lumina of the vessels and aiding coagulation. The author has made use of this method in six cases, without any success, all the women dying. He criticises the action of the tampon. If the gauze is a foreign body, why are not the placenta itself and the clots which form in the uterus just as good for this purpose? A very large amount of gauze may be inserted, and this soon becomes entirely soaked with blood. Thus the compression of the blood-vessels is impossible, since they can be compressed only against a hard substance, and the tampon becomes very soft as soon as it is soaked with blood. If the uterus would contract the vessels might be compressed, but in these cases there is no muscular contraction. When the tampon is used the danger of infection is much increased. The sterilized hand is a much more effective instrument, and much less likely to produce sepsis, besides giving the operator a chance to massage the uterus freely with the hands. The narrower the space in which thrombosis has to occur the quicker will coagulation take place. The tampon distends the uterus, which is the opposite of the effect desired. This is truly a last refuge in postpartum hemorrhage. In the Woman's Hospital at Basel, out of 10,000 women confined, seven have died of hemorrhage after labor, six with the tampon. The author has tried injections of adrenalin in two cases, without result. The author believes from his microscopic examinations that there is a pathological condition of the uterine muscles in these cases. The only effective method left seems to be the removal of the uterus by vaginal total extirpation, or supravaginal amputation. The abdominal operation takes but two minutes, and then the bleeding stops at once, and the patient may be cared for at leisure. The question of sterilizing a woman is a serious one in a young primipara, but it must be solved quickly or it will be too late.

The Influence of Antistreptococcus Serum on Bleeding after Labor and on Thromboses in the Puerperal State.—A. Mayer (*Gyn. Rund.*, Bd. xiv, 1909) discusses whether the injection of antistreptococcus serum can have any influence on the coagulation of the blood in cases of bleeding from the site of the placenta after the removal of the latter. This has been made use of as a prophylactic measure before labor, in the clinic at Heidelberg, as a routine procedure. The author has made experiments as to the effect this serum has upon the blood. In septic affections the coagulation power of the blood is known to be lessened. The author experimented *in vitro* on the blood plates and blood serum, testing it before and after injections of antistreptococcus serum in animals. He found that the coagulation was decreased immediately after the injection, but that this effect did not last long. He experimented on three dogs into which he injected human serum before and after the antistreptococcus injection. A half hour after the injection the coagulation was decreased. Three hours later this effect was over. In four pregnant women who had received the injections he tested the blood; half an hour to two hours after the injection, coagulation occurred in five and a half to six minutes; more than two hours later it coagulated in three minutes. The injection of antistreptococcus serum thus appears to retard coagulation for about two hours, while it increases it after two hours.

GYNECOLOGY AND ABDOMINAL SURGERY.

Cancer of the Uterus.—Weyemberg (*Bull. de la Soc. Belge de Gyn. et d'Obst.*, April 22, 1909) gives the results of the examination of 6,236 cases of genital disease in women. Of this number there were sixty-six cases of cancer well established at the time of the first examination. This shows that the majority of cases of uterine cancer are not diagnosticated until they are well advanced. This is in great part due to the reluctance of women to consult a physician for the symptom hemorrhage. The age varied from 37 to 67 years, and all except four of these women had borne children, showing the effect on the etiology of this disease of child-bearing. Fifty-six cases were advanced and inoperable at the time of examination, the broad ligaments being involved. Of the remainder of the patients eight had hysterectomy done, and three have had recurrences. The infiltration of the ligaments may not be perceived until operation reveals its extent. Twenty cases were cauterized with a view to rendering their lives more bearable. The author removes with scissors all the outgrowths of tissue and cauterizes the inside of the uterus with a gauze tampon soaked in pure formalin which remains for one minute in contact with the tissues. This causes separation of the diseased portion and leaves a clean, firm surface. The odor and hemorrhage are relieved and the general conditions is improved. When recurrence takes place in the surface of the uterus the cauterization is repeated, with the same result. The author pleads for education of the general public, especially women, in the opinion that a hemorrhage of the uterus or a discharge should cause them to apply at once to a physician for diagnosis and treatment. Many lives might be saved if cancer could be treated sooner.

Sarcoma of the Cervix Uteri.—Renato Pirani (*Ann. de Gyn., et d'Obst.*, May, 1909) says that carcinoma is found more frequently in the lower part of the uterus, while sarcoma especially affects the body. Sarcoma of the uterus is characterized by the great variety of forms and of cells contained in it. Virchow divides these tumors according to the seat of development into those of the parenchyma and of the mucous membrane. Sarcoma may be circumscribed or diffuse. In many cases it results from the degeneration of a preexisting fibroma. If the tumor has a capsule it is more likely to be a primary growth. The author reports a case of primary malignant tumor of a connective tissue nature, a mixed sarcoma, originating in the interstitial tissue of the uterus. The prognosis of such growths is entirely bad.

Cancer of the Uterus.—Reviewing 254 cases of this affection,

E. B. Young and J. T. Williams (*Bost. Med. Surg. Jour.*, Feb. 25, 1909) say that cancer of the uterus should be suspected whenever, in any woman over thirty, there is an increase in the quantity of the regular menstrual flow, whenever there is the slightest bleeding except at the regular periods; and whenever there is the onset of vaginal discharge of any kind without an obvious reason. The possibility of its presence should be considered in any woman of this age in whom there is a gradually increasing loss of flesh and strength when no cause can be discovered on a general physical examination, even in the absence of pelvic symptoms. The reappearance of flowing after the menopause is almost pathognomonic. These symptoms do not necessarily mean that the patient has cancer, but they do demand immediate investigation. They may be symptoms of other conditions or they may be manifestations of malignant disease, and a diagnosis can be made only by examination. No time should be lost in making an early diagnosis, for cancer may be present for weeks or months without obvious signs and may have advanced to such an extent as to have become inoperable within one month after the onset of symptoms.

Bearings of Pathology on Prevention, Diagnosis and Surgical Cure of Carcinoma of the Cervix.—Victor Bonney (*Practitioner*, June, 1909) states that, according to the returns of the Register-General, one in every eight women over the age of thirty-five years is fated to die of malignant disease of some kind. Carcinoma of the cervix will probably account for some 20 per cent. of those thus dying. Every parous woman over thirty years of age, who suffers from chronic cervicitis, carries about in her the potential antecedent of carcinoma of the cervix, just as every man with a chronic superficial glossitis is liable to malignant disease of the tongue. The profession should impress upon married women that chronic leucorrheal discharges should be treated at once. In cases of advanced cervicitis, the best treatment, in the patient's interests, is to amputate the vaginal cervix. There is only one absolute test for carcinoma of the cervix in its initial stage—a thorough microscopical examination of a number of serial sections of the suspected tissue. A single section may be sufficient, but at times is worse than useless. In all cases in which the clinical signs point strongly to incipient malignancy, it is wiser to excise the vaginal cervix even though the sections examined have proven negative. The two common clinical forms of carcinoma of the cervix are the massive excrescence and the deep rugged-sided excavation. These are easily recognized. There are two other forms, however, in which the diagnosis is much more difficult. The first of these is that where, in spite of an extensive growth producing great hypertrophy of the cervix, the mucosa covering its vaginal aspect is continued up to the very edge of the external os as an unbroken layer. The appearance of such a cervix, even when looked at under an anesthetic, and with the vaginal vault well exposed, may be almost normal. The second type is that in which the vagina is aged and shrunken, and at the top of it a small depression occupies the place of the vaginal cervix—a common feature in advanced senile atrophy of the genital canal. Blood is seen oozing from a small aperture in the apex of this depression, but no feel or appearance of growth is manifest. For the complete removal of a malignant growth extending both by lymphatic permeation and tissue infiltration, pathology demands an excision so planned that the line of incision should lie well outside the macroscopic edge in the regions where growth by infiltration is occurring, while in the regions of permeation it should extend sufficiently widely to embrace the whole lymphatic tract into the region of uninvolved glands. To fulfill these demands, Wertheim's operation or some modification of it appears to be destined to become the only one practised for the cure of carcinoma of the cervix. Its average mortality rate cannot be applied to individual cases. Given a comparatively early and clean case, it might be reduced to zero.

Calculus in the Lower Segment of the Ureter in the Female.—A. E. Isaacs (*Med. Rec.*, June 19, 1909) advocates localization of the calculus by radiography and approach by an inguinal incision. Through this the peritoneum is raised until the ureter is exposed, when the latter is separated from the peritoneum and drawn up from the pelvis by a traction strip passed around it. By this means the calculus is easily accessible as low down as one and one-half inches from the vesical orifice of the ureter. If lower, it could probably be forced into the bladder or upward until in an accessible portion of the ureter.

Solitary Tuberculosis of the Breast.—E. M. von Eberts (*Amer. Jour. Med. Sci.*, July, 1909) says that there is no reported case of this condition before puberty, while the number decreases rapidly after the menopause. In addition to the maturity of the gland, lactation would seem to be possibly the most important predisposing factor, as the incidence of the disease in married and unmarried subjects has been in the proportion of four to one. In those cases occurring in glands which have functionated, there is a history of inflammation complicating lactation in 42 per cent. and suppuration in 20 per cent. Traumatism as a predisposing factor has rarely been mentioned. Two clinical forms of the disease are recognized, the nodular and the confluent. In the nodular form of the disease, one or more nodules are found, generally deeply imbedded in the parenchyma of the gland. The disease tends to run a protracted course, the nodules frequently remaining the same size for years; eventually they gradually increase in size and proceed through the stages of degeneration, suppuration, and fistula formation. In the confluent form, the onset is more acute; there is greater enlargement of the breast, pain is an early symptom, and degenerative changes, with fistula formation, develop early. It is this form of the disease which is most frequently met with during lactation. Retraction of the nipple has been noted as a primary symptom in three cases. The course of the disease in the confluent form is not infrequently hastened by the presence of a secondary (pyogenic) infection. While it is conceivable that a partial extirpation might be the rational practice in cases in which a single nodule has developed in the periphery of the gland without lymphatic infection, it is the consensus of opinion that complete amputation of the breast should be carried out in all cases, together with the resection of the axillary glands when these are thought to be the seat of tuberculous disease. Under specific conditions one may be justified in staying operative interference until the effect of a course of tuberculin has been ascertained. Such cases may be considered favorable for his plan of treatment in which the disease is discrete, when chronicity is a prominent clinical feature, and when the possibility of lactation can be safely excluded. A breast the seat of chronic tuberculous disease, altered anatomically by the development of scar tissue, and especially one in which there is retraction of the nipple, should not be allowed to functionate. Patients should be urged to make a radical change in the environment in which the disease was contracted. For at least three months absolute rest should be insisted upon, with fresh air and feeding as in pulmonary tuberculosis.

Treatment of Chronic Exudative Adnexal Inflammations and Pelvic Exudates by Hot Mud Bandages and Compresses.—Nikolaus Cukor (*Gyn. Rundschau*, 1909, Jahr. III. Bd. xiii) advocates the use of hot mud compresses over the abdomen in exudative inflammations of the pelvis and adnexa. The mud is heated much more slowly than water, and cools much less quickly. The heat is much better borne by the patient than in hot-water applications, and about ten degrees greater heat can be applied in this way. The mud used is the result of the decay of plants for thousands of years, and is a nonconductor of heat. If the surface be covered with woolen cloths, the heat will be retained for several hours. The effects of the application are hyperemia, dilatation of the pelvic blood-vessels, and on account of the weight of the mud pressing out the blood from the vessels, and the transudation of leukocytes and phagocytosis, the removal of exudative material. The treatment is contraindicated in acute cases with fever and pus formation. The applications may be made conveniently by the patient at her own home while lying down. The greater temperature that can be applied and less perspiration caused make this treatment superior to hot-air applications.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

ACUTE INFLAMMATION OF THE NASOPHARYNX IN INFANTS AND YOUNG CHILDREN.

WITH THE REPORT OF TWENTY CASES.

BY
OSCAR M. SCHLOSS, M. D.,
New York.

(With three charts.)

SINCE 1868, when Wilhelm Meyer called attention to the clinical importance of adenoid hypertrophy in the nasopharynx, this region has been of considerable interest. The importance of nasopharyngeal inflammation as the cause of otitis media is recognized. It is also well known that the nasopharynx offers a fertile soil and abundant opportunities for bacterial invasion, that when inflammation is present the toxins are readily absorbed and the bacteria can enter the blood or lymph stream. The frequency of nasopharyngeal inflammation in infants is attested by the frequency of "rhinitis," for no one can seriously doubt that in most cases of so-called rhinitis the seat of the disease is the nasopharynx, the origin of the nasal discharge. In spite of this knowledge the acute inflammatory affections of the nasopharynx have not received the attention merited by their frequency and importance.

It is the object of this paper to call attention to the form of acute nasopharyngeal inflammation which gives rise to general symptoms and is frequently complicated by otitis media and cervical lymphadenitis. From clinical observation the writer is convinced that this type of inflammation is very frequent in early life. The data on which this paper is based were obtained from twenty cases, seen during the past eighteen months.

The anatomy* of the nasopharynx and associated structures has an important influence on the diseases of this part, and for this reason merits a separate consideration. The mucous membrane of the nasopharynx is extremely vascular, and is rich in adenoid tissue which commonly hypertrophies, giving rise to adenoid vegetations. In structure these vegetations are similar to the faucial tonsils, differing only in the absence of crypts, the relatively small amount of connective tissue and the greater vascularity. The tissues of the nasopharynx are drained by two distinct groups of lymphatic vessels. The majority of the lymphatics lead to the retropharyngeal glands but a number pass directly to the internal group of the substernomastoid glands. The retropharyngeal glands are small, two, as a rule, are present on each side about 2 cm. from the median line; additional glands, when present, are very small. These glands lie close to the base of the skull between the pharyngeal muscles and the prevertebral aponeurosis. The deep cervical or substernomastoid glands form a continuous chain beneath the sternomastoid muscle and can be divided into two groups, internal and external. The internal group lies on or immediately adjacent to the external border of the internal jugular vein and receive among their afferents the efferent lymph-vessels from the retropharyngeal glands. Thus the lymph flow from the nasopharynx reaches the internal group of substernomastoid glands either directly through lymphatics arising in the nasopharynx, or indirectly through the retropharyngeal glands. The greater part of the lymph flow goes to the upper members of this group of glands. These glands are covered by the inner border of the sternomastoid muscle near its insertion and are directly behind the angle of the jaw. The Eustachian tube in infants is more horizontal in its course and is relatively larger than in adults.

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* The following have been consulted in the preparation of this section: The Lymphatics, Delemere, Poirier and Cunéo, translated by Leaf; Keener and Co., 1903; The Nasopharynx in Infancy, J. L. Morse, *Bost. Med. and Surg. Jour.*, 1907; The Lymphatic Drainage of the Faucial Tonsil, G. B. Wood, *Am. Jour. Med. Sc.*, vol. cxxx, page 216; System of Medicine, Allbutt and Rolleston (Semon and Williams), vol. iv, part ii, page 95.

Acute infection of the nasopharynx forms a part of the clinical and pathological picture of some of the acute infectious diseases. This is constant in measles and the infectious colds, and almost as frequent in scarlet fever. Diphtheria of the nasopharyngeal mucous membrane is not uncommon. It may be confined to this region or it may be secondary to diphtheria of the nose or pharynx.

The primary inflammatory affections of the nasopharynx are described by Finkelstein(1) under the title of retronasal angina. This writer considers that the adenoid tissue in this region is frequently diseased, and says that if posterior rhinoscopy is possible it can be demonstrated that the pharyngeal tonsil is subject to catarrhal, follicular, and exudative inflammation—the same forms which occur in the faucial tonsil. Cervical lymphadenitis is described as a frequent if not constant accompaniment. Among other complications otitis media is mentioned which may be severe.

Acute streptococcic infection of the pharyngeal adenoid tissue is the subject of a recent paper by Dr. Alice J. Bryant(2) who emphasizes the importance of the inflammatory affections of this tissue. In the described cases the patients, all of whom were adults, suffered from the general disturbances common to acute infections. There were slight evidences of pharyngitis, but the physical signs and posterior rhinoscopic examination disclosed the nature of the disease. Inflammation of the posterior wall of the pharynx was noted, the lymphoid follicles in this location were swollen and often gave rise to a purulent secretion. At times part of the nasopharyngeal secretions found exit through the nose as a thick purulent discharge. The remainder drained into the pharynx and was visible on the posterior wall. Every evidence of severe nasopharyngeal inflammation was present, but none of the cases were complicated by otitis media or cervical lymphadenitis.

In most of the text-books on pediatrics the inflammatory diseases of the nasopharynx do not receive separate consideration but are described under the title of rhinitis. In the descriptions of this disease severer forms are mentioned, which correspond in part to the type of nasopharyngitis to be considered in this paper.

The nasopharynx is the source of infection in most of the acute forms of otitis media. By direct extension an acute inflammation can spread to the middle ear, or a chronic nasopharyngeal catarrh associated with adenoid growths may be responsible for the otitis media. When this catarrh is present, the Eustachian tube and middle ear are often similarly affected, and an exacerbation of the inflammatory condition gives rise to the acute attack of otitis media.

The origin of many cases of cervical lymphadenitis can be traced to the nasopharynx. Most of the simple forms of cervical lymphadenitis result from infection in the tonsils or nasopharynx; by lymphatic absorption the bacteria or their toxines are transferred from the infected area to the glands. In most cases of enlargement of the cervical glands a careful search will reveal the causative infection, but cases are seen where the only signs are those of the glandular disease. These cases are explained by the assumption that all evidence of the causative infection had disappeared, that the subjective symptoms were slight and were in consequence overlooked. It is also possible that bacteria can be carried by the lymph stream to the glands, without producing inflammation of the tissue through which they enter. The importance of nasopharyngeal infection as the cause of cervical lymphadenitis is emphasized by Hochsinger (3) who gives evidence to prove that the so-called glandular fever is merely a secondary lymphadenitis due to inflammation in the nasopharynx or pharynx. Finkelstein (4) quotes Hochsinger, Zappert and Trautmann to the effect that the glandular fever of Pfeiffer and Filatow is not an independent disease but a complication of nasopharyngeal infection.

Only one clinical variety of nasopharyngeal inflammation will be dealt with in this paper. Depending on the predisposing and exciting causes inflammation in the nasopharynx as inflammation elsewhere, can be of varying severity, and it is needless to say that severe symptoms and complications may be entirely lacking. This is well shown in some of the common colds. The horizontal position, relatively large size, and patency of the Eustachian tube in early life, render conditions favorable for the transfer of infection to the middle ear, and the abundant adenoid tissue and numerous lymphatic vessels tend to make lymphadenitis a frequent complication of the severer nasopharyngeal infections.

Remote complications will not be considered as none occurred in the writer's cases, but the absorption of toxins or the entrance of microorganisms into the circulating blood render their occurrence possible. Erythema nodosum and exudativum, purpura, arthritis and inflammation of other serous membranes, and nephritis, have been described (Finkelstein).

The form of nasopharyngeal inflammation to be now considered is acute and primary; it usually causes severe symptoms and presents well-defined clinical signs by which it can be recognized. When observed from the onset there is a rather definite type to which most of the cases conform. The first stage is one of nasopharyngeal inflammation, the second that of the complications.

It will be well to give a general description of the disease first, and later to discuss the symptoms and complications as they occurred in the individual cases.

The past history is usually unimportant, with the possible exception of previous attacks or the presence of adenoids. The onset is sudden, appetite is lost, the child is feverish, cross, and restless during sleep. Older children may complain of headache and general pains in the joints and muscles. Cough is a constant symptom; it is short, frequent, and unaccompanied by expectoration.

At the onset there may be little to explain the severity of the symptoms. The general appearance of the child is that common to the acute infective diseases: the face is flushed, the respirations frequent, and the child is at times restless and irritable, at others languid. Sometimes there is slight cyanosis. Nasal discharge may be present and ranges from a scanty, thin, watery secretion to one that is abundant and muco-purulent. Congestion of the faucial pillars and the margins of the soft palate and uvula are frequent signs; the uvula is sometimes swollen and edematous. In a few cases the tonsils are reddened, they are rarely swollen, and an exudate is exceptional. Nasal respiration is obstructed and may be abolished. The posterior wall of the pharynx is red, the lymphoid follicles inflamed, and the mucous membrane often covered by a purulent secretion, of which the greater portion originates in the nasopharynx. Digital exploration of the nasopharynx, when possible, will show swelling of the mucous membrane and in the severer cases the nasopharyngeal space may be almost obliterated. The initial rise of temperature may reach 104 to 105° F. The temperature curve always shows an evening rise of 1 to 4° when it may reach 105°. In some cases the temperature is intermittent. The pulse and respirations are usually increased in proportion to the fever; when nasal obstruction is complete the respiration-pulse ratio may be high.

The fever and general symptoms continue, if uninfluenced by treatment, and from the third to the sixth day the tympanic membrane becomes reddened and now or later there may be enlargement of the cervical glands. The glandular swelling first appears behind the angle of the jaw, a position which corresponds to the upper members of the internal substernomastoid group of glands. Though the swelling first appears in these glands, others may be subsequently affected, since there is always free communication between neighboring lymphatic glands.

In all instances the disease is not as severe as outlined and the primary stage, that of nasopharyngeal inflammation, may be mild, with the accompanying temperature below 101°. Complications may be very mild or very severe with all gradations between these extremes. The otitis media may produce early rupture of the tympanic membrane, but in some instances congestion of the blood-vessels of the tympanic membrane is the only sign of the inflamed middle ear. The glandular enlargement shows similar variation in degree. In many patients the only evidence of adenitis is fullness behind the angle of the jaw, in others the glands become very large with early abscess formation.

Retropharyngeal abscess and torticollis may be complications. Abscess formation in the retropharyngeal glands produces the former; the probable cause of the latter is irritation of the sternomastoid muscle or its motor nerves by inflammation of the adjacent lymph nodes.

The real nature of the disease may be lost sight of if the patient is first seen after the appearance of complications, and the adenitis or the otitis media alone receive consideration. The important features of the disease may be tabulated as follows:

I. *Primary Infection.*—Nasopharyngitis. Acute inflammation of the nasopharynx. Sudden onset. Severe general symptoms.

II. *Complications.*—Appear third to sixth day of illness.

1. Acute otitis media.
    a. Suppurative.
    b. Nonsuppurative (catarrhal).
2. Cervical lymphadenitis.
    a. Suppurative (abscess formation).
    b. Nonsuppurative.
3. Complications due to lymphadenitis.
    a. Retropharyngeal abscess.
    b. Torticollis.

The following histories are given in illustration.

CASE I.—J. K., five months. In hospital as a feeding case. Pale, poorly nourished. Beginning rickets.

January 18.—Nurse reports that child has a temperature of 103° F., coughs frequently, and has vomited two feedings.

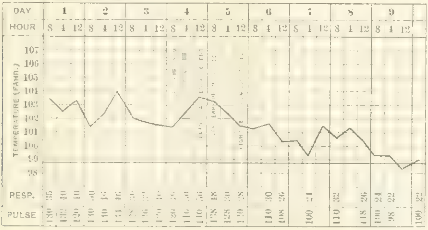
Status Presens. Skin sallow, mucous membranes pale, superficial lymph-nodes palpable in neck, axilla, and groin. Nasal respiration abolished. Pillars of fauces slightly congested. Posterior pharyngeal wall red and covered by a muco-purulent secretion. Ears negative. Examination of heart and lungs shows nothing of importance. Liver palpable 3 cm. below costal margin, in right mid-clavicular line. Spleen not felt. Urine: sp. gr. 1025, high colored, slight trace of albumin. No other pathological constituents. White blood-cells 22,000 per cubic mm., polymorphonuclear cells 52 per cent., lymphocytes 33 per cent., large mononuclear cells 8 per cent., eosinophiles 3 per cent., basophiles 3 per cent., 400 cells counted.

January 19.—Temperature continues high, child takes only part of food and is very restless. Slight increase in congestion of pharynx since yesterday.

January 20.—The general symptoms continue unabated. The soft palate and uvula are quite congested, the latter a little swollen. There is a mucopurulent secretion covering the posterior pharyngeal wall and after removal it reaccumulates from above. The cough continues and is frequent and short.

January 21.—In the right side of the neck behind the angle of the jaw is a swelling, and on palpation enlargement of the glands underneath can be determined. The right tympanic membrane appears normal, the left is slightly congested. Profuse discharge of pus from the nasopharynx.

January 18, 1908.



CASE I.

January 22.—Swelling on right side of neck much more marked, slight glandular enlargement on left side in corresponding location. Left ear-drum is red and bulges in posterior portion, incision shows presence of pus. Right membrane slightly congested.

The temperature was above normal for nine days from the time of onset of the illness. The left ear continued to discharge freely; the glands remained stationary in size for about two weeks and then began to resolve without suppuration. The congestion of the right tympanic membrane had entirely disappeared in four days. The glandular enlargement was moderate on the right side and very slight on the left.

CASE II.—A. O., twenty-six months. Slight nasal discharge and cough one week preceding present illness. Temperature normal until onset of present disease.

January 23.—Temperature 102° F., refuses all food, vomited once, coughs frequently.

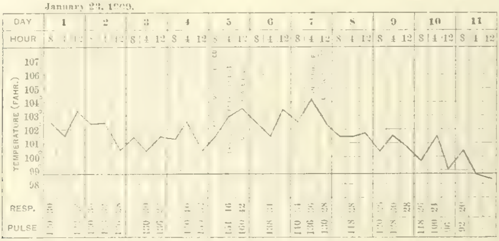
Status Presens. Well-nourished and well-developed child. Face flushed, very restless and seems quite ill. Slight mucopurulent nasal discharge. The follicles on the posterior pharyngeal wall are prominent, the mucous membrane is reddened and is covered by a tenacious mucopurulent secretion. It can be demonstrated that the greater portion of this secretion comes from the nasopharynx.

January 24.—Child still quite ill. Physical signs the same as at time of last note. Is very restless, breathes with mouth open and sleeps poorly. White blood-cells 18,000 per cubic mm., polymorphonuclear cells 78 per cent., lymphocytes 15 per cent., large mononuclear cells 5 per cent., eosinophiles 1 per cent., basophiles 0.2 per cent., 400 cells counted.

January 25.—Patient seems a little better and takes more food. Nasal obstruction marked. Other signs the same.

January 26.—No change since last note.

January 27.—A. M. Both tympanic membranes quite congested, no bulging. Slight swelling behind angle of jaw on both sides. P. M. Child is very uncomfortable and has taken little food. Both ear-drums are red but not bulging; on incision the discharge was bloody.



CASE II.

January 28.—Purulent discharge from both ears. Glands on left side of neck quite large, local temperature increased over swelling and the mass is adherent to the skin. The swelling on the right side of neck has not increased.

January 29.—Fluctuation in mass on left side of neck. Incision shows presence of thick yellowish pus. Patient seems better.

From this time the patient improved but the temperature continued above normal for four days. During this time the ears and the abscess seemed to be draining well. The abscess continued to discharge for two weeks; two months later there was still a slight discharge from both ears. Digital exploration of the nasopharynx at this time demonstrated the presence of adenoids.

CASE III.—J. M., seventeen months. Otitis media at eight months. History otherwise negative.

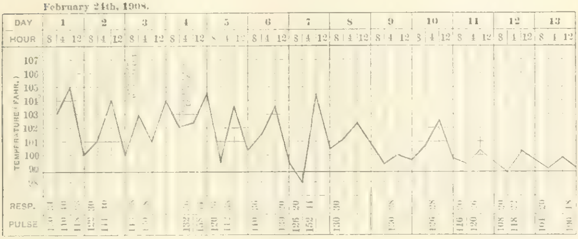
February 24.—Reported ill. Temperature 103° F., cough, vomited morning feeding, refuses all other food. Very restless last night.

Status Presens. Child appears quite ill, breathes through mouth, slight clear nasal discharge. Tonsils slightly enlarged, moderate congestion of margin of soft palate. Posterior wall of pharynx red and covered by mucopurulent secretion, lymphoid follicles prominent and inflamed. Spleen palpable just below costal margin. Examination otherwise negative.

February 25.—Seems worse this morning. Throat more congested than yesterday, purulent nasal discharge, purulent secretion in back of pharynx. Examination of blood smear shows nothing of importance.

February 26.—Refuses all food. Slight swelling in both sides of neck behind angle of jaw. Few coarse dry râles in both lungs posteriorly. Urine negative. The purulent secretion in the back of pharynx continues and has origin in the nasopharynx.

February 27.—Slight congestion of both tympanic membranes.



CASE III.

The swellings in neck have increased in size and the individual glands can be felt.

February 28.—Patient seems a little better. Ears slightly more congested than yesterday, glands slightly larger. The glands are discrete, not adherent to skin or deeper tissues and fluctuation is not present.

The temperature continued to run an irregular course for a week, during which time there were no changes in either the glands or the tympanic membranes. The nasal discharge cleared up about the sixth day of the disease, but the mucopurulent secretion from the nasopharynx, seen on the posterior pharyngeal wall, was constantly present. After the temperature reached normal the congestion of the ear-drums disappeared and the enlarged glands slowly resolved. Two months later there was still slight enlargement of the glands.

The important features of the cases are shown in the accompanying chart which requires little explanation. Sixteen of the twenty cases were seen within the first two days of the illness, before signs of either complication were evident. In the remaining four the history was sufficiently clear to warrant their inclusion. All of the references to the duration of the acute illness and the day of the disease on which complications appeared are not exact, since the majority of the patients were seen in dispensary practice. This error cannot in any instance be great, as during the acute illness all of the patients were seen at intervals of two days and many were seen every day.

Cultures were made in all of the severe cases and the absence of the diphtheria bacillus shown. It is unfortunate that cultures were not made with the view of determining the causative organism but these were omitted in the routine of dispensary practice. Reasoning from analogy, the pus cocci, the pneumococcus, or the influenza bacillus are the most probable causative agents.

The following statistics derived from the charted cases may prove interesting. The youngest patient was five months old, th oldest four years. One patient suffered from anemia, rickets, and malnutrition at the time of onset of the illness, the remaining nineteen were in fair health. Fourteen of the patients had symptoms of adenoid growths, four had previous attacks of "rhinitis," and two gave history of otitis media. In eighteen patients the onset of the disease was sudden; two had a nasal discharge previous to the illness, but fever and general symptoms were absent.

During the course of the disease nasal discharge was present in ten cases; it was catarrhal in two, muco-purulent in eight. In the remaining ten cases nasal discharge was not evident. The nose was examined in nine patients, six of whom had a nasal discharge. Beyond slight congestion of the nasal mucous membrane in four patients, the examination was negative.

The signs of nasopharyngeal inflammation were as follows: Nasal obstruction, partial or complete, evidenced by mouth-breathing. Inflammation of the posterior pharyngeal wall with swelling, and in some instances inflammation, of the lymphoid follicles. A purulent secretion from the nasopharynx, always visible on the posterior pharyngeal wall and in some instances giving rise to a nasal discharge. Inflammatory reaction of the soft palate and uvula was often present and was usually confined to the free margins of these structures. Cough was a constant symptom, and with the exception of one case showing pulmonary signs, was due to the nasopharyngeal inflammation.

Complications were noted in all cases. Adenitis was present nineteen times; it was bilateral in seventeen instances, unilateral in two. The degree of glandular enlargement varied; it was slight in eight cases, moderate in eight, and great in four. Abscess occurred in five cases; it was unilateral in four, bilateral in one.

It might be expected that enlarged retropharyngeal glands could be felt in this disease, but in the cases where digital exploration of the nasopharynx was made, this could not be determined.

Of the sixteen cases of otitis media, ten were suppurative, resulting in spontaneous rupture of the membrane or requiring incision, and six were nonsuppurative. Suppurative otitis media was unilateral in two cases, bilateral in eight.

Five patients had only one complication; four adenitis, and one otitis media.

As noted in the chart three patients developed retropharyngeal abscess, and the only fatality in the series was due to this cause. The one instance of torticollis is interesting. On the day of admission the only signs were those of nasopharyngitis and right-sided torticollis. Two days later there was a moderate enlargement of the glands beneath the right sternomastoid muscle. The etiology of the torticollis is obvious.

The seven cases in which neither complication was suppurative are of diagnostic interest. All of these patients suffered from severe general symptoms, and four had no nasal discharge. In these cases the general symptoms were probably due to the nasopharyngeal infection alone.

There are some features of this disease, illustrated by the reported cases, which are worthy of further discussion.

At the onset of the illness, before complications have appeared, it is certain that the symptoms are due to the nasopharyngeal infection. After the onset of complications it is difficult to determine whether the general symptoms are due to the complications or to the primary disease. In cases where the complications were mild with no evidence of suppuration, and the temperature elevated for many days in the continuous presence of nasopharyngeal inflammation, it seems probable that the nasopharyngeal disease was the important factor.

The type of nasopharyngitis embraced in this report is usually classed either with rhinitis or with influenza.

The presence of a nasal discharge in some of the cases is the only basis for the diagnosis of rhinitis, even though it is well known that, in infants, most discharges from the nose originate in the nasopharynx. The term rhinitis does not explain the nature of this disease. The severity of the symptoms, the clinical signs, and the course and complications presented by these cases distinguish them from true rhinitis, and stamp them very clearly as an acute inflammatory affection of the nasopharynx.

The cases are usually diagnosed influenza in which the general symptoms are severe and out of proportion to the physical signs. There is much contention at present concerning the bacterial cause of influenza, but this has no direct bearing on the present discussion. No matter what the causative organism may be, the seat of the disease—in the variety of influenza with which we are concerned—is the nasopharynx, and the symptoms and complications are referable to the pathological process in this location. A number of the charted cases show the characteristics of this variety of influenza. With few physical signs there was great prostration and other evidences of severe toxemia. The temperature was high with marked fluctuation and often showed a remittent curve.

Is the pathology of this disease primarily an inflammation of the adenoid tissue, analogous to tonsillitis, or is it an inflammation of the nasopharyngeal mucous membrane as a whole? Positive evidence can only be obtained by posterior rhinoscopic examination which is difficult if not impossible in infants and young children. The similarity of the faucial and so-called pharyngeal tonsil has been pointed out, and it can be demonstrated in adults and older children that primary inflammation of the nasopharyngeal adenoid tissue is not uncommon. In the writer's cases the presence of adenoid growths in many instances, and the frequent inflammation of the lymphoid follicles in the posterior pharyngeal wall, a continuation of the nasopharyngeal adenoid tissue, is very suggestive.

Treatment.—For the rhinopharyngitis some bland cleansing wash is of decided value; for this purpose Seiler's fluid, a saturated solution of boric acid, or normal saline can be used. The fluid should be hot and it is best to avoid force in its application. It is usually sufficient to pour the fluid into the nostrils from a spoon. Argyrol in 3 per cent. solution can be dropped into the nostrils from an ordinary eye pipette, but perhaps better is eucalyptol 15 minims to one ounce of liquid albolene or liquid petrolatum. Menthol or camphor 1 to 3 grains to the ounce may be used in place of the eucalyptol, or all three can be given in the same solution. The addition of adrenalin 1–10,000 to 1–5,000 is sometimes of advantage. In addition to the antiseptic and astringent action of the dissolved ingredients, the liquid petroleum preparations render nasal-breathing more comfortable.

When there is inflammation of the middle ear, hot irrigations of bichloride 1 to 10,000 to 1 to 5,000, or of hot normal saline solution, repeated at intervals of two hours, are indicated. When possible heat may be applied over the mastoid process and external ear. On evidence of fluid in the tympanic cavity the membrane should be incised.

In the early stages of adenitis local application of cold by means of the ice-bag or coil will tend to relieve the pain and may prevent suppuration. When the swelling has ceased to increase, ichthyol ointment, 10 to 50 per cent., can be kept constantly over the area. Hot applications may be of value at this stage, but when abscess occurs the treatment is surgical.

It is not my object to describe a new disease, for the cases discussed are common, though their true nature is not always recognized. I feel, however, that the importance of the subject is sufficient justification for this report. It may be that the nature of some obscure cases will be explained if the frequency of this affection is borne in mind, and this is especially true in those cases where nasal discharge is slight or entirely lacking. When cervical lymphadenitis is due to an acute inflammation in the nasopharynx, the recognition and treatment of the causative infection is of great importance. Probably many cases of otitis media where the temperature continues high and the general symptoms do not abate, despite thorough incision of the membrane and the establishment of good drainage, are of the sort described. The actual cause of the symptoms is an acute inflammation of the nasopharynx with resulting toxemia, while the more apparent disease, otitis media, is merely a complication.

I wish to thank Dr. Thomas S. Southworth for his kindness in permitting me to use the histories from his service at the Nursery and Child's Hospital, and the out-patient department of the Babies' Hospital, and Dr. Eli Long for the use of the material from the children's clinic at the New York University and Bellevue Medical College.

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[1] The Diseases of Children. Pfaundler and Schlossman. English trans., H. K. Shaw and L. E. LaFetra, Lippincott, 1908.

[2] *Journal Am. Med. Asso.*, June 13, 1908.

[3] Das sogenannte Drüsenfieber der Kinder. *Wien. med. Woch.*, 1902.

[4] *Loc. cit.*

No.	Age	Previous Condition	Onset	General Symptoms	Physical Signs	Complications	Febrile Period	Result
1	5 mos . .	Poorly nourished, anemic, rickets.	Sudden . .	Vomiting, cough, anorexia, restlessness, fever.	No nasal discharge. Congestion of pharynx. Inflammation of post. pharyngeal wall with purulent secretion from nasopharynx. Nasal obstruction.	Double otitis media, suppurative on left. 3d day (incised). Glandular enlargement both sides 5th day.	9 days	Discharge left ear, 3 weeks. Glandular enlargement 2 mos.
2	7 mos . . .	Slight rickets, well nourished, adenoids.	Sudden . .	Fever, cough, sleeplessness, dyspnea.	Purulent nasal discharge. Cyanosis. Muco-purulent secretion on wall of pharynx. Congestion of pillars of fauces and post. pharyngeal wall. Nasal obstruction.	Moderate enlargement of glands on both sides 4th day. Nonsuppurative. Double otitis media 4th day, suppurative on left (incised).	14 days . .	Otorrhea, 1 mo. Slight enlargement of glands at end of 2 mos.
3	8 mos . .	Mouth breather, several attacks of acute "rhinitis" during winter.	Slight nasal discharge 1 week previous to onset.	Cough, fever, restlessness, moderate dyspnea.	Profuse muco-purulent nasal discharge. Congestion of pharyngeal walls. Purulent secretion over back of pharynx. Nasal obstruction	Double cervical adenitis (slight) 5th day, nonsuppurative. Double otitis media 5th day, nonsuppurative.	16 days . . .	Ears clear in 3 weeks. Slight glandular enlargement at end of 6 weeks.
4	9 mos . . .	Difficult feeding case, mouth breather, two previous attacks of "rhinitis."	Sudden . .	Irritability, anorexia, fever, cough. Very ill through whole disease.	Whole pharynx congested. Profuse muco-purulent secretion in back of throat. Nasal obstruction marked. Slight mucoid nasal discharge, marked cyanosis.	Double suppurative otitis media 4th day. Double cervical adenitis. Marked glandular enlargement. Retropharyngeal abscess 15th day.	28 days . . .	Death.
5	10 mos .	Under treatment for congenital syphilis, no symptoms for 6 mos. Adenoids.	Sudden .	Restlessness and irritability, fever, anorexia, cough.	Tonsils and pillars of fauces congested, soft palate very red, uvula edematous, purulent secretion in back of pharynx, moderate purulent nasal discharge, nasopharynx so swollen that digital exploration is impossible.	Double suppurative adenitis 6th day, two operations on left side, one on right. Double suppurative otitis media 8th day. Ear drums incised	5 weeks . . .	Recovery, 6 weeks.

No.	Age	Previous Condition	Onset	General Symptoms	Physical Signs	Complications	Febrile Period	Result
6	10 mos	Mouth breather	Sudden	Cough, restlessness, dyspnea, vomiting. Patient was very ill at onset.	No nasal discharge, profuse secretion on post. pharyngeal wall, follicles on wall of pharynx very prominent, cyanosis.	Double cervical adenitis 3d day, nonsuppurative. Glandular enlargement slight. Double otitis media, 3'd day, nonsuppur. Moderate congestion of membranes.	7 days	Ears clear in 10 days. Resolution of glands in 3 weeks.
7	10 mos	Good	Sudden	Cough, fever, restlessness, anorexia.	No nasal discharge tonsils large and slightly reddened. Pus on pos. wall of pharynx, great swelling of nasopharynx (digital exploration).	Double suppurative otitis media 6th day, incision of both membranes.	14 days	Otorrhea 3 weeks
8	11 mos	Fairly nourished. Mouth breather.	Sudden	Vomiting, cough, anorexia, dyspnea, sleeplessness, very ill.	Purulent nasal discharge, complete nasal obstruction, soft palate and uvula very red, pus covering pharyngeal wall, cyanosis.	Double cervical adenitis 5th day, suppurative on right. Double purulent otitis media 4th day, spontaneous rupture of right membrane, left incised. Retropharyngeal abscess 14th day, operation.	20 days	Otorrhea 6 weeks, recovery in 6 weeks.
9	1 year	Otitis media at 6 mos., general condition good.	Sudden	Vomiting, cough, fever.	No nasal discharge, breathes through mouth, purulent secretion on posterior wall of pharynx, follicles prominent and pharyngeal wall reddened.	Marked enlargement of cervical glands, both sides, 4th day. Retropharyngeal abscess. Operation 9th day.	17 days	Recovery in 3 weeks.
10	17 mos	Slightly anemic, adenoids	Sudden	Vomiting, cough, fever, anorexia.	Profuse purulent nasal discharge, posterior pharyngeal wall reddened, follicles prominent, purulent secretion from nasopharynx, few dry râles in both lungs posteriorly.	Slight enlargement of cervical glands both sides 8th day, no abscess formation.	12 days	Recovery with decline of temperature.

No.	Age	Previous Condition	Onset	General Symptoms	Physical Signs	Complications	Febrile Period	Result
11	18 mos.	Adenoids, otherwise good	Gradual with nasal discharge.	Very slight, child irritable, slight cough.	Slight watery nasal discharge, moderate muco-purulent discharge on post. pharyngeal wall, digital exploration shows swelling of tissues of nasopharynx.	Slight congestion of both ear drums 5th day (?). Slight enlargement of cervical lymph nodes 6th day (?).	15 days (?)	Recovery at end of febrile period.
12	19 mos.	Previous attack of "rhinitis," good	Sudden	Cough, fever, anorexia, apparent pain on swallowing.	No nasal discharge, inflammation of pillars of fauces and posterior pharyngeal wall, purulent secretion from nasopharynx, breathes through mouth.	Double purulent otitis media, both membranes incised, first signs 6th day, operation 8th day, slight glandular enlargement both sides 4th day.	19 days	Otorrhea ceased 14th day. Slight glandular enlargement at end of 1 mo.
13	2 years	Adenoids, otherwise healthy.	Sudden	Cough, vomiting, restlessness, complains of pain in throat.	No nasal discharge, congestion of soft palate and posterior pharyngeal wall, purulent secretion on latter, nasal obstruction.	Moderate enlargement of cervical glands both sides 4th day, congestion of left tympanic membrane 4th day.	8 days	Left ear drum normal in 10 days. Glands normal in 1 month.
14	2 years	Purulent otitis media 8 mos. ago. Mouth breather	Sudden	Cough, fever, face greatly flushed and child is very irritable. Slight dyspnea	Cyanosis, moderate purulent nasal discharge, complete nasal obstruction, pus on posterior wall of pharynx	Double purulent otitis media 4th day, operation, slight glandular enlargement, 5th day.	10 days	Otorrhea 1 mo. Glands normal at end of 2 mos.
15	26 mos.	Adenoids, well nourished.	Sudden	Cough, sleeplessness, anorexia.	No nasal discharge, purulent discharge from nasopharynx, breathes through mouth.	Double cervical adenitis 4th day, suppurative on left, operation 6th day.	9 days	Not seen after abscess healed.
16	26 mos.	Several attacks of rhinitis, adenoids. General condition good.	Slight nasal discharge 1 week.	Vomiting, anorexia, fever, restlessness, cough, slight nasal discharge and cough 1 week.	Slight muco-purulent nasal discharge, posterior wall of pharynx red, follicles prominent and covered with tenacious muco-purulent secretion, partial nasal obstruction.	Double suppurative otitis media 3d day, spontaneous rupture on left, right membrane incised. Moderate enlargement of cervical glands. Abscess formation on left side.	12 days	Recovery complete when seen 6 weeks after onset of illness.

No.	Age	Previous Condition	Onset	General Symptoms	Physical Signs	Complications	Febrile Period	Result
17	2½ years	Good	Sudden	Not very severe, cough, anorexia, fever, pain on swallowing	No nasal discharge, slight purulent discharge from nasopharynx, great swelling of walls of nasopharynx (digital exploration).	Slight enlargement of cervical glands and congestion of ear drum 4th day.	8 days	Seemed normal at end of febrile period save slight glandular swelling.
18	3 years	Good	Sudden	Complains of sore throat, not very ill, pains in limbs, slight cough.	No nasal discharge, swelling of tissues of nasopharynx, pharyngitis lateralis, tonsils moderately enlarged, slightly congested.	Torticollis right side 4th day, enlargement of glands of right side 6th day.	6 days	Torticollis disappeared in 6 days, slight glandular enlargement at end of 3 wks.
19	3 years	Adenoids, Well nourished	Sudden	Cough, restlessness, loss of appetite, headache	Slight watery nasal discharge, redness of post. pharyngeal wall and of soft palate and uvula, pus on post. wall of pharynx.	Double suppurative otitis media 3d day, operation 4th day, moderate glandular enlargement both sides 3d day.	9 days	Enlarged glands and otorrhea 2 mos.
20	4 years	Mouth breather	Sudden	Cough, sore throat, fever, pains in head and back	Slight purulent nasal discharge, tonsils congested and swollen, slight easily removable exudate, swelling of follicles on posterior pharyngeal wall, purulent secretion from nasopharynx.	Enlargement of cervical glands on left side 4th day, signs of suppuration 6th day, operation. Congestion of both ear drums 6th day.	8 days	Ears clear on 8th day. Abscess well in 2 weeks from time of incision.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of May 13, 1909.

ELI LONG, M. D., *in the Chair.*

BABY WITH CLUB-FEET PUT UP IN PLASTER BOOTS.

DR. HENRY W. FRAUENTHAL presented this child in order to bring out discussion as to the proper time to treat congenital club-foot in children. A photograph shown gave the condition previous to the application of plaster boots; it showed marked equinovarus. The first plaster boots were applied when the child was eleven days old. Three casts had been applied, and the child's feet were now in good condition. If one followed the advice of some of our leading orthopedic surgeons and waited until the child was five years old an extensive operation would have to be performed. Dr. Frauenthal had put up four cases under three weeks of age within the past three months.

DISCUSSION.

DR. ELI LONG said that the child was certainly young to have its feet put up in plaster and inquired if Dr. Frauenthal knew of anyone who had gotten good results from this method of treatment.

DR. FRAUENTHAL replied that he could show several cases that had been treated in this way within the past six months. This case as shown by the photograph had very badly deformed feet and had been nearly cured in three treatments covering less than one month's time. This treatment was in opposition to the advice of good men but still they did not get such good results so easily and in such a short time.

CASE OF CONGENITAL STRIDOR.

DR. CHARLES HERRMAN presented this case which was from Dr. La Fetra's service at the Vanderbilt Clinic. The labor was normal and the child apparently healthy until two days old, when a peculiar crowing sound was first observed. The sound has become accentuated since that time. The child makes no noise when asleep, but when it becomes excited or takes a deep breath the noise is very distinct. It sometimes makes the noise when taking the breath. Examination showed a distinct dullness over the upper part of the sternum, which might indicate an enlarged thymus. The *x*-ray might show this. The generally accepted theory in regard to the etiology of this condition is that it is due to a congenital malformation of the larynx. In a child the larynx is a little different from the larynx of an adult; it is not unfolded, but as the child grows older the epiglottis unfolds and the stridor disappears. Dr. Thompson thinks that there is an incoordination of the respiratory muscles. The malformation may be present as well. The sound is not heard in expiration. In the case presented there is no marked interference with respiration, no retraction or other sign of obstruction. Another view is that the condition is due to an enlarged thymus, whose pressure causes the stridor. There seems to be a lack of evidence in support of this view. Autopsies have been performed in a number of these cases, and they always show the same peculiar form of larynx. This would seem to indicate that the larynx is the cause of trouble, and the fact that the condition appears practically from the time of birth also points to the larynx as the cause of the trouble. Medicine produced but little effect upon the condition.

CASE OF PERSISTENT JAUNDICE.

Dr. Herrman then presented an infant four months old which was also from Dr. La Fetra's service. There was no suspicion of specific disease, and there were ten other healthy children in the family. The birth was normal and the baby breast-fed. On the tenth day the mother noticed that the baby was jaundiced. The baby was seen on April 14, at the age of three months, when it weighed ten pounds and five ounces. The child presented the usual symptoms of this condition. The liver was 4 cm. below the border of the ribs in the mamillary line, the spleen 2 cm. below. The patient had been under observation for about a month, during which time the condition and weight had remained about the same. The intensity of the jaundice and the amount of bile pigment in the urine and feces had varied from time to time. A careful consideration of the case ruled out icterus neonatorum, sepsis, pressure from a new growth and pointed to simple catarrhal jaundice, though this condition is exceedingly rare at such an early age. It was difficult to account for the condition, though it was probably due to some infection.

A CASE OF STATUS LYMPHATICUS.

Dr. G. R. Satterlee presented a male child, two years of age, who had been admitted to Washington Heights Hospital April 10. His family history was good, his birth had been normal and a sister six years of age was alive and well. This child had never had any disease except diphtheria. The child began the present illness with convulsions which had become more and more frequent and severe. They were usually ushered in by an attack of crying with apparent pain in the lower jaw. Physical examination on April 19, 1909, showed a boy of normal size and development for his age. There was an area of distinct dullness, 2 cm. to the left of the left edge of the sternum in the first and second interspaces, and extending on the right almost to the right border of the sternum above to the upper edge of the manubrium sterni. This area of dullness was continuous below with that of cardiac dullness. The enlarged thymus was thought to be the cause of this dullness; an *x*-ray picture taken on May 5 confirmed this opinion. The heart was hypertrophied in both right and left ventricles. There was a systolic murmur over the base in the neighborhood of the pulmonic area which was not transmitted. This murmur has disappeared. The abdominal muscles are rigid, the area of the spleen percusses dull to a moderate extent, but the spleen itself cannot be palpated. There are evidences of rickets present, the right testicle is undescended, there are adenoids and the tonsils are slightly enlarged. The deep cervical lymph nodes are palpable and the superficial posterior cervical, axillary, epitrochlear, and inguinal nodes are enlarged. The thyroid gland is also slightly enlarged, and the superficial veins running down into the region of the thymus and those on the anterior part of the thorax are distended. Blood examination on April 14 and 15 showed 4,000,000 red blood-cells, slight polychromatophilia, moderate number of normoblasts, a few microblasts and 94 per cent. hemoglobin, index 1.2. Leukocytes, 11,000, differential count, 67 per cent., polynuclear neutrophiles, 23 per cent., lymphocytes, 8 per cent. large mononuclear and transitional leukocytes, 1 per cent. eosinophile leukocytes and 1 per cent. basophile leukocytes.

The feces at this time were soft, slimy, stringy, lemon-yellow, of very foul odor, and contained much mucus microscopically. The temperature was normal during the first seven days in the hospital. From April 10 to April 17, the patient had numerous convulsions, as many as eight a day. The treatment during this time consisted in milk diet with milk of magnesia and high saline colon irrigations twice daily. The convulsions were treated in the usual way. On April 17, the child was too weak to sit up, regurgitated food, and was taken home, though chloral seemed to have controlled the convulsions. On April 18, the patient was admitted with convulsions lasting three minutes. The stridor was less marked, the color of the skin improved and the mental condition brighter. Examination of the urine on May 8 showed nothing unusual. Cyanosis was present during the convulsions and crying attacks which last steadily over an hour. On May 5, an *x*-ray photograph was taken under light chloroform anesthesia. After beginning the chloroform the pulse became very irregular and intermittent, but no symptoms of cardiac insufficiency were present. A diagnosis of status lymphaticus was made on the enlarged thymus, the dyspnea with inspiratory stridor, the enlarged veins of the neck and thorax, the convulsions preceded by fits of crying and accompanied by inspiratory stridor. The rickets and intestinal disturbance were carefully considered, but do not seem to be the controlling factors. The hypertrophy of the heart and its action under chloroform anesthesia also pointed to status lymphaticus as the condition present.

DISCUSSION.

DR. NORTHRUP asked whether there was any difference in the respiratory murmur and dullness on the two sides.

DR. SATTERLEE replied that there was some dullness at the left, but there was no respiratory murmur noted.

DR. J. FINLEY BELL cited the case of a baby in his service in the Englewood Hospital. The child came in with pneumonia and finally developed inspiratory stridor and mediastinal dullness. He thought that he felt the thymus, but after several weeks a swelling was noted between the scapulæ which upon opening yielded a quantity of pus found upon bacteriological examination to contain pneumococci and no other organism. The stridor at once disappeared and also the mass thought to be the thymus. This was an encysted mediastinal empyema or a mediastinal abscess. The child made an uneventful recovery.

DR. LONG said the case reminded him of one he had seen which presented very similar conditions and in which the diagnosis was intestinal disturbance.

DR. W. P. NORTHRUP did not often make a diagnosis of enlarged bronchial lymph nodes, but cited a case in which there were several good reasons for the diagnosis. The child was quite as well nourished as this one and showed a distinct shadow in that region. It had a decided diminution of respiration on that side and a distinct asthma on provocation, a couple of enlarged nodes above the clavicle on the same side and a distinct widening of the shadow in the region of the thymus. The shadow showed as distinctly as did the spinal column. Dr. Emil Mayer had examined the child with the bronchoscope and at first thought that he saw some obstruction, but felt later at the next examination that he had been mistaken. The bronchi and right part of the trachea were very distinctly congested. If the child's head was pushed backward he stopped breathing. On the slightest provocation he had attacks of asthma and diminished respiration on that side. At times he had a little temperature. He thought this was a case of enlarged bronchial glands and asked if any mention had been made of enlarged glands in the case reported.

DR. JOHN HOWLAND had not examined the case carefully but from the pictures it appeared that the thymus was slightly enlarged. An enlarged thymus did not necessarily mean status lymphaticus, for that term was usually applied to children dying from the enlarged thymus or when that was the only pathological sign present and there was no other apparent cause for death. It was frequently said of children who died suddenly from traumatism, acute disease, or cerebrospinal meningitis, that they died of status lymphaticus. It might be said that the picture was found because they died so suddenly. Hochsinger, in an article an laryngeal stridor, says that he examined thirty cases and found an enlarged thymus shadow in each; he then examined some perfectly healthy children and found an enlarged thymus in a large percentage of these also. While there was such a pathological entity as status lymphaticus the picture of enlarged thymus was probably more frequent in children than was supposed.

TWO CASES OF EMPYEMA.

Dr. O. M. Schloss reported these cases:

Case I.—A child, aged three months, was admitted to Dr. Long's clinic at Bellevue Medical College, complaining of cough, fever, and loose bowels. The child was breast-fed, and there was nothing of importance in the family history. One month ago she became ill and the attending physician who saw the case said that she had bronchitis. According to the mother, the child was very ill for two weeks, then improved for a few days, when she became worse again. At the time of her admission to the hospital the child took her food poorly, had from three to five loose bowel movements daily, had fever with profuse sweats every night. The cough was frequent, short, and hard with no expectoration. On examination the physical findings were localized on the left side of the chest. The left side looked a trifle larger and moved less on respiration than the right. Tactile fremitus was absent on the left side, but well marked on the right. The apex impulse was not palpable at the usual site but could be felt about 3 cm. within the left mid-clavicular line, corresponding to the fifth left interspace. The left side of the thorax was flat on percussion from the angle of the scapula to the costal margin posteriorly, and anteriorly from the fourth rib to the costal margin, while above these points the percussion note showed inpaired resonance. The breath and voice sounds were very faint over the whole left side and at the base of the lung were not heard. The right border of the cardiac dullness was made out 3 cm. to the right of the right sternal margin. There was a well-marked paravertebral triangle of dullness on the right side. The temperature was 102°, pulse 120, and respiration 40 per minute. An exploratory puncture showed thick, yellowish pus, from which streptococcus and staphylococcus aureus were grown. An incision 2 1/2 cm. long was made in the seventh interspace in the anterior axillary line and about 120 c.c. of pus evacuated. Although the operation took but a moment, and the pus was allowed to escape very slowly, a profound collapse followed. After the usual stimulants the child was sent home in a very unpromising condition. The recovery was rapid, though there was still a little superficial dullness. The prognosis in this case was considered bad, as streptococcic empyemas are generally regarded as most virulent and there is a general impression, substantiated by text-books, that infants under six months of age with empyema die more often than they recover.

CASE II.—This patient had pneumonia two years ago, and at the end of the third week the diagnosis of empyema was made. Operation was refused. The child was very ill for eight months, coughing up large amounts of pus, having fever and sweats every night, and losing in weight. Finally he began to improve and the cough became periodic. The child often coughed up as much as a cupful of pus. The worst coughing spells were in the mornings and evenings. Five months ago the child was admitted to the clinic at Bellevue Medical College. At this time he had no fever, a pulse of 110, and respirations 50 per minute. The fingers and toes showed marked clubbing and the nails were incurved. Physical examination of the chest gave all the typical signs of empyema. Several exploratory punctures were made with negative results. The white blood-cells were never more than 13,000 per cm., and the relative percentages of the cells normal. The patient had only occasional slight rises of temperature. The sputum was examined many times for the tubercle bacilli with negative results. The *x*-ray revealed nothing of importance. During the past two months the child has improved, gained in weight, slept well, and the physical signs, though still present, are less marked. The respirations are still rapid.

In this case the pus was removed either by lymphatic absorption or by rupture into a bronchus, probably the latter. Pleural thickening and adhesions had formed and the lung was probably bound down and adherent. The question is whether this patient has bronchiectasis. The scattered areas of bronchial breath sounds, the occasional cavernous quality, and the veiled puff, the periodic expectoration, the absence of pleural effusion and the variation in the physical signs at the different examinations are in favor of this diagnosis. It would be interesting to see if the patient would develop the bone changes described by Marie of which the club fingers are the first sign.

DISCUSSION.

DR. ELI LONG asked if any others could report cases of empyema that had not been operated upon. This case had been sent to Professor Northrup's service at the Presbyterian Hospital for operation.

DR. NORTHRUP said if he remembered correctly the diagnosis had been old empyema. The child had spit up the pus, and absorption and retraction had done the rest. The *x*-ray and needle showed no pus and so the child had not been operated upon.

DR. LONG said that it was interesting to know that the von Pirquet test was now positive, while two months ago it was negative.

DR. SCHLOSS stated that the mother had told him that the child used to spit up as much as a bowlful of pus. Of course that quantity was uncertain, but it was probable from the history that the child had nothing to be operated for as he had spit up the empyema.

DR. LONG said that the case was particularly interesting to him because he had the idea that such cases when operated on when under one year of age died. If a baby could do as well as this one he would in the future revise his prognosis in empyema.

DR. NORTHRUP had had a case only seven weeks old which did as well as this one.

SOME CASES OF LISPING.

DR. E. W. SCRIPTURE had recently reported some cases of psychoneuroses which could be termed stuttering, but this time he would show some entirely different diseases which might be termed "negligent speech." This disease was characterized by a lack of precision and correctness in using the muscles of speech and was due to mental negligence, laziness, or inattention. Most of the cases might be grouped under the term "lisping." They could be readily cured by comparatively simple methods and there was usually no need of sending them to a specialist. The most common form of negligent speech was where the patient said "t" instead of "s." It was a fundamental law that they did not perceive their errors of speech unless they felt them with the tongue and were able to correct the sound also. To cure this fault insert a thin stick or probe over the middle of the tongue. When he tries to say "toap" the stick produces the narrow channel necessary for the "s." He actually says "soap" and hears and feels himself doing it. Another common form of negligent speech was shown by a child who said "tum" for thumb and "tin" for thin and so on. For the sound the tongue must be put so lightly against the palate that air escapes at the sides. Through negligence this boy presses his tongue too tightly and makes t or d. To cure him you place a stick or probe across the front part of the tongue sidewise and tell him to say thumb; the stick keeps the tongue partly down and he says it. Another boy in saying s produces a blast of air through his nose. The snort is distinctly heard and the s seems to have disappeared. This was due to pure carelessness. An effective method of curing this is to place a nasal tip in one nostril, connect this with a rubber tube with a glass end and hold this end in front of a candle flame. Every time the air is permitted to pass through his nose the candle flame is blown. The child sees his defect and is able to correct it. Some cases of lisping arise from organic defects such as tongue-tie and high-arched palate, but most of them are due to mental sluggishness.

Many of these cases of lisping do occur from tongue-tie, but the cases presented to-night are due to pure negligence. Of course when the tongue is tied the person naturally lisps. He had seen a number of cases of high palate and arch in which the speech defects were corrected by teaching the child to press the tongue a little more tightly against the palate. If this is done, the groove is closed and the "s" can be pronounced correctly.

DISCUSSION.

DR. NORTHRUP inquired if most of these cases were not due to some mental defect.

DR. SCRIPTURE said that some of the cases do show mental dullness, but with most it was a case of mental sluggishness or carelessness.

SARCOMA OF THE KIDNEY, PROBABLY CONGENITAL, IN AN INFANT.

DR. J. FINLEY BELL, of Englewood, reported this case. The patient was a male infant, four months old, seen in consultation on February 17. The baby had been breast-fed, and Dr. Paratt, who called Dr. Bell in consultation, had not seen the baby from the time of birth until the previous day. The baby had been apparently normal at the time of birth. The enlargement of the abdomen was of two weeks' standing, but the baby had cried a great deal, and for the past four weeks had not nursed as vigorously as a normal baby should. The urine was diminished in quantity. Examination revealed the fact that the child was much emaciated, the abdomen greatly enlarged, the fontanels open and their contour and size about normal. The heart was displaced, the apex beat being 1.50 cm. external to the nipple line and in the third interspace; the sounds were normal but weak. Vesicular breathing was diminished and bronchial breathing accentuated. There were no râles. The chest conditions were due to the enormous pressure against the diaphragm from below, crowding the thoracic organs upward unto the apical portions of the thorax and spreading the chest so that the lower ribs were quite horizontal. The circumference of the abdomen at the umbilicus was 49.5 cm. The largest circumference was 51.5 cm. The veins and capillaries of the abdominal wall were prominent. There was an umbilical hernia and the skin was tense and shiny. The entire abdomen was flat on percussion. The area of liver dullness was very high; the spleen could not be found. On close examination there was greater prominence on the left side. Owing to the marked dyspnea, cardiac embarrassment and severity of pain the child was removed to the Englewood Hospital and tapped. The punctures in several places gave a clear, straw-colored fluid of syrupy consistence. About 400 c.c. of fluid was removed, but there was no appreciable difference in the abdominal distention. There was, however, some respiratory relief. A trocar was introduced on the following day with the hope of reaching a large cavity in the sac in order to relieve the thoracic pressure so that with good feeding the general condition of the baby might be improved as a preparation for a radical surgical operation. After repeated efforts to relieve by tapping it was concluded that they had a congenital hydronephrosis to deal with and that this hydronephrosis was multilocular. It was decided to hazard opening the abdomen. The child being in a desperate condition, the parents consented. The abdomen was opened in the median line between the umbilicus and ensiform. For a time the respiration seemed to improve under chloroform when suddenly, just as the abdomen was entered, it ceased and the radial pulse disappeared. Artificial respiration was immediately performed and amyl nitrate substituted for chloroform. In a short time respiration was reestablished and oxygen was administered while the operation was being completed. There was considerable shock, and active stimulation was required during the night. The baby was unable to suck after the operation, and was fed with a dropper. Two days later the mother's milk failed, so that whey and cream mixture were substituted. The patient continued stationary until the wound refused to drain, when respiratory and circulatory conditions grew worse and on April 3 the baby died. While these cases were by no means rare, they occurred with sufficient infrequency to make each one interesting. From the history, course, and autopsy findings one was justified in making a diagnosis of congenital sarcoma of, or in the region of the left kidney, its hilum or ureter causing obstructive hydronephrosis, multilocular in character.

Autopsy on Dr. Bell's Case.—DR. D. S. D. JESSUP reported that the abdomen was filled with a large retroperitoneal mass lying more on the left side than on the right. It extended from the diaphragm to the symphysis and overlaid the right kidney. It was a thin-walled multilocular cyst, and running over its surface from the region of the spleen to the right brim of the pelvis were colon and sigmoid. The mass was adherent laterally on the left side and posteriorly to the muscles. The renal vessels entered and left it opposite the light kidney. After the removal and escape of considerable fluid the tumor measured 20×18 cm. The anterior portion was composed of many thin-walled cysts. Posteriorly the kidney structure was continuous with a soft pale growth which extended forward through the mass to the cystic portion. There were regions of escaped blood and dark necrotic tissue. The liver was small and congested, the gall-bladder distended with light yellow bile, the spleen small, firm and red, and the lungs congested at the base. Sections from various portions of the tumor showed a growth of large oval and spindle cells which appeared to bear an intimate relation to the connective-tissue stroma. There were areas of red cells in the stroma and thin-walled blood-vessels distended with red cells. The walls of the smaller cyst were composed of connective tissue infiltrated by the new-growth cells and lined by flattened cells. Sections of the kidney parenchyma showed thinned blood-vessels, proliferation of the glomeruli and some increase of connective tissue. A diagnosis was made of spindle-celled sarcoma with cystic degeneration. A section of the right kidney showed swelling of the tubule cells, congestion and patches of round-celled infiltration. The right adrenal was normal. The heart was also normal.

DISCUSSION.

DR. BELL said that Dr. Jessup had asked him to present the specimen. A photograph of the body was made before autopsy. The findings were those just described. The tumor as shown was much smaller than when it lay in the abdomen on account of the leakage. The microscopic examinations showed spindle-celled sarcoma, with blood-vessels and hemorrhagic areas. In reply to an inquiry Dr. Bell said that the suprarenals seemed to lie above the growth, involving the whole kidney. Dr. Jessup could not say what were the detailed microscopic findings. He had shown the tumor to a number of men, and the consensus of opinion was that it was ordinary sarcoma. Other portions might show other conditions. It was a very large tumor and sections would have to be made from many places to exclude other structures.

DR. NORTHRUP said that while not very common, these tumors were not very rare. One peculiarity was that they seemed to grow from a single pole of the kidney, the tumor being so large that the kidney seemed to be grafted upon it.

DR. BELL said that some time ago Dr. Jacobi reported a case of still-birth in which there was found sarcoma of the kidney.

SQUINT IN AN INFANT EIGHTEEN MONTHS OLD CORRECTED WITH GLASSES.

DR. W. H. HOLZAPFEL apologized for presenting a case which might not be very interesting to the pediatrician. The case was an infant, eighteen months of age, admitted to the New York Eye and Ear Infirmary for strabismus, the left eye converging about 30 degrees. Examination under atropine showed refractive error of one and one-half diopters hyperopia in right eye and two and one-half diopters in the left. Glasses were prescribed accordingly. The patient returned to the hospital three weeks later. With the glasses on both eyes remained straight. The patient had since been seen several times and the eyes remained straight. The case was one of many of similar type. The best results were obtained in children, for after the eye became more fixed in position, not only glasses but operation was also necessary to obtain binocular vision. The common cause of squint was hyperopia and not, as often supposed, scarlet fever, measles, whooping-cough, a fall, etc. In only a few cases was the cause paralysis of the extrinsic ocular muscles. Any defect in the muscle equilibrium became more noticeable during fatigue, illness, etc. Modern methods enabled the ophthalmologist to measure the focus of an eye with a remarkable degree of accuracy without any information from the patient.

DISCUSSION.

DR. J. FINLEY BELL reported two cases of squint occurring in his practice during the past eighteen months. In the first case the squint came on suddenly, and the child was referred to an oculist who said it was not possible to fit glasses for a child of that age, and advised the local use of atropin with cleansing of the intestine and careful diet. The second case was a child two and one-half years old and in whom the condition appeared during an attack of whooping-cough. The squint was not continuous, but would be present and then disappear. After the whooping-cough subsided the condition recurred much less frequently. It was a satisfaction to learn that this condition could be successfully corrected with glasses in a young child.

DR. SOUTHWORTH said that last summer he had seen a small boy, two and a half years of age, who had a squint, and he had been told by ophthalmological friends that it was of the highest importance that the child should have glasses. They said that if it was a unilateral squint the child would undergo such an amount of change in the nerve that later he would not be able to recover from it. The case was referred to one of the prominent ophthalmologists in one of the large western cities, and he told the parents to bring the child to him when it was four or five years old and he would see what he could do for it. This indicates that the position taken by the best ophthalmologists here has not yet reached to the West. It is of the highest importance that such a squint should be corrected early so that the power of the eyes may not be lessened.

DR. LONG was surprised to learn that babies so young were subjected to wearing glasses, and had asked Dr. Holzapfel how the patient liked it. He replied that you could not get them off—she wanted to sleep in them. He had then asked another ophthalmologist what his experience was, and it was just the opposite. He could not make the child wear them so long as her hands were free; the mother, however, plastered them on with adhesive plaster, and after a while the child grew accustomed to them.

While the operation for squint in a child is not particularly dangerous, still it is something that one does not like to undertake, and it is very satisfactory to know that there is some way of avoiding it. These remarks of Dr. Holzapfel's were particularly gratifying on that account. As soon as a baby begins to focus, if there is any suspicion that it is going to have a squint, the defect can be entirely prevented by the use of glasses.

He then inquired of Dr. Holzapfel what proportion of cases responded satisfactorily to this treatment, and was told that satisfactory results are obtained in the vast majority of cases; though comparatively few cases were seen in infants, as the children are seldom brought to the ophthalmologist until they are from five to ten years old.

DR. NORTHRUP said that Dr. Southworth had brought out a very important point—the preservation of the function of the eye. It is very important to have the defect corrected early so that there is no permanent loss of power. He would like to know how long the child has to wear the glasses.

Dr. Holzapfel replied that the eye is the first part of the body to become fully developed, and if the child is far-sighted when it is brought for treatment it remains for all time, and they have to wear the glasses permanently. Squint is in most cases the result of hypermetropia.

He has had but few cases due to myopia. Perhaps nine out of ten are hyperopic.

Dr. Pisek inquired what arrangements the eye men had to test young children—those who could not read the letters. That difficulty had arisen in his work, and he had arranged a card with animals on it or some such familiar objects, for example, a shoe. From these he had test cards made, the figures being in certain proportions corresponding with the letters on large cards and going down the scale to the smaller ones. Children who could not read could tell him what the object was, and in this way he has been able to determine their acuity of vision.

Dr. Holzapfel said that Dr. Pisek had spoken of not being able to measure the children on account of their not knowing the letters. When measuring for glasses the ophthalmologist does not ask the patient to read the letters, but does the measuring himself. We do not need to talk to the patient to measure the focus.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Condensed Milk Mixtures in Diarrheas.—W. A. Northridge (*Pediatrics*, May, 1909) advocates the use of condensed milk mixtures as a remedy for persistent diarrhea in gastroenteric cases. It checks the diarrhea promptly and the stool becomes normal. It is very important to change back to a fresh food at the earliest possible moment, as any prolonged and exclusive use of these sterilized foods tends to cause grave disturbances of nutrition. When the passages have become normal and have remained so for a few days, one should change back again to a fresh food. If the diarrhea returns, the patient should be put again on the condensed milk mixture.

The Nervous Child.—H. L. K. Shaw (*Pediatrics*, May, 1909) emphasizes the point that both heredity and environment are responsible for the development of the nervous child. Reflex irritation, whether from preputial adhesions or gastrointestinal disturbance, is an important factor. The lack of appetite is the symptom which most alarms the mother. The best results are obtained from treatment when the child is removed from his ordinary surroundings. Parents must be taught that the child is imitative and must learn to hold themselves in check in his presence. The feeding is the most important and controlling factor in the treatment. A plain diet of milk, eggs, cereals, and broths should comprise the nourishment. A proper regulation of the feeding hours is important. All meals should be given at a definite time each day and these hours should never be changed. Too frequent feeding may create a dislike for food. Several hours a day in the open air and proper ventilation of the sleeping room should be insisted upon. A cold sponge each morning has a marked tonic effect.

Acute Dilatation of the Stomach in Infancy.—W. P. Lucas (*Arch. Ped.*, June, 1909) reports that an eleven-months-old baby while nursing in his usual ravenous fashion suddenly gave a short gurgling gasp, straightened out, rolled his eyes, and seemed, to all appearances, about to die. The epigastrium was greatly distended. Grasping the abdomen and making firm pressure backward and slightly up toward the chest, air came up and a gush of milk. There was an immediate change in the appearance of the child. The color came back, there were a half-dozen short gasps and then gradually the normal breathing. A hypodermic of brandy and aromatic spirits of ammonia was given. The child had had, within five days before this attack, three somewhat similar to the one described and always followed by belching of gas and rather copious vomiting. They were doubtless due to the same cause, acute dilatation of the stomach which had been relieved spontaneously. In looking up the literature the writer has found but two cases of acute dilatation of the stomach in infancy. Doubtless some of the sudden deaths in infancy may be attributed to this condition. The probable causes might be summed up in rapid nursing with the simultaneous ingestion of a greater or less volume of air, with the normal safety valve of vomiting omitted, in a child with perhaps not too strong heart muscles.

Still's Disease.—This affection is defined as "a chronic progressive enlargement of the joints, associated with general enlargement of the glands, and enlargement of spleen." Donald Hingston (*Arch. Ped.*, June, 1909) reports two cases whose histories and appearance correspond with that of this disease. The first was treated, one year after the onset of symptoms, by fresh air, arsenic, massage, and passive movements of the affected joints. Treatment was given regularly and recovery apparently took place. The second case improved at once under arsenic, massage, and warm baths, but the treatment was not carried out regularly and relapses were frequent. These relapses corresponded fairly well with the periods when treatment, especially the administration of arsenic, was discontinued.

Bacterial Content of Whey. O. M. Schloss (*Arch. Ped.*, June, 1909) records several counts made of bacteria in milk and in whey prepared from the same. These show that in the rennin coagulation of milk many of the bacteria are included in the clot and the whey contains far fewer bacteria than the corresponding milk.

Malnutrition in the School Child.—E. M. Sill (*Jour. Amer. Med. Assn.*, June 19, 1909) presents statistics of malnutrition on the lower east side of New York. He believes that ignorance on the part of parents as to food values, cooking, how to live, cleanliness, fresh air and sunlight is a more important factor in the causation of malnutrition of the children than poverty. He says that our first duty should be to instruct the mothers in the schools and clinics, either by word of mouth or printed directions, as to what foods are best for the growing child, which are the most nutritious and healthful for the money, the best way to cook different foods, what articles of diet to avoid, and the necessity of plenty of fresh air and sunlight, and cleanliness. Warm clothing is a necessity. These children should be given foods that contain a large amount of proteid material. The dietary most valuable consists of milk (a quart a day), cocoa, eggs, red meat (once a day), fowl, fish, bread and butter, and cereals, such as oatmeal, farina, hominy, cornmeal, rice, pure olive-oil, and cream if possible, with vegetables, such as spinach, stewed tomatoes, stewed corn, cauliflower, baked and creamed potatoes, purees of beans or peas, and baked beans, and fresh fruit, such as oranges, pears, apples, raw and baked and in the form of apple sauce, and stewed prunes. The children should stop school, be out in the open air as much as possible, open the windows at night and air the room thoroughly by day, go to bed at 7 or 8 o'clock and take a rest in bed for an hour or two after the midday meal. Bathing is encouraged for the purpose of cleanliness, and a salt-water bath followed by a vigorous rub for its stimulating and invigorating effect. The writer's ideas of the remedy are somewhat socialistic. He believes that the present condition of affairs in the congested parts of our great cities could be entirely changed and controlled by laws, and that there is no reason why New York may not have as good tenements as Berlin. No reference is made to restriction of immigration of the undesirable type which prefers the congested districts and so tends to perpetuate the unfavorable conditions. He says that as a child is a valuable national asset, it should be the public duty to provide nourishing food for those children, especially in the public schools, who are starved through negligence, ignorance, or poverty of their parents.

Inspiratory Stridor and Dyspnea in Infants.—A. D. Blackader and H. S. Muckleston (*Arch. Ped.*, June, 1909) say that congenital laryngeal stridor is differentiated from laryngospasm by its occurrence in otherwise healthy children; by its early onset, generally within the first two weeks after birth; by the more or less persistence of the stridor, and by the small amount of dyspnea to which it generally gives rise. An infant, healthy and normal in other respects, is noticed within the first or second week after birth to make a croaking sound with each inspiration, a sound which may rise in its note to a high-pitched crow, especially on excitement or when a sudden and more vigorous breath is taken. Expiration is generally noiseless, but may be accompanied by a short grunt when the inspiratory noise is loudest. In a few cases the inspiratory noise continues in a modified way even during sleep. The voice is clear; crying and coughing are unaffected. Breathing, though noisy, is usually unaccompanied by distress, and cyanosis seldom appears. There is more or less retraction of the soft parts of the thoracic walls, showing impediment to the entrance of air. The infantile larynx differs from the adult larynx not only in size and in the more yielding character of its walls, but also in the shape and comparative size of its upper entrance. The epiglottis, instead of curving upward on its posterior aspect is only slightly raised and is distinctly folded so that its two sides are approximated, thus much narrowing the entrance way between the thin and somewhat membranous aryepiglottic folds. The writer reports five cases of the affection. He finds that the majority of recent observers regard the cause of the stridor as purely mechanical and consider that in this affection we have to deal with an exaggeration of the normal infantile type of larynx; a condition due to defective development in the larynx itself rather than dependent upon any spasmodic or incoordinated respiratory act, although this latter may have some influence. The stridor, which is persistent for the greater part of the time, appears to be due to the vibration of the aryepiglottic folds, which on sudden and deep inspiration become sufficiently tense to give a high note. The character of the sound, however, is variable, and is dependent upon the condition of the folds themselves, upon the amount of stenosis present, and upon the degree to which the membranes are stretched. Though not usually considered as threatening life, one-sixth of the cases reported have died from affections of the respiratory system. In all cases with severe suffocative attacks inducing much cyanosis, the possibility of a fatal obstruction must be considered by the physician. It is, invariably, by the mother. Such cases are best treated in a hospital, where a sudden emergency can be quickly met, till the danger lessens with advancing age and development.

Pain and Pott's Disease.—C. C. Wholey (*Jour. Amer. Med. Assn.*, June 12, 1909) believes that Pott's disease would be much more frequently and earlier diagnosed if its initial manifestations, of which pain in the form of backache is often conspicuous, were looked for and recognized. Backache is of diagnostic value chiefly when unilateral and when guardedly controlled by accompanying facts of diagnostic importance.

Treatment of Pott's Disease.—L. W. Ely (*Med. Rec.*, June 26, 1909) says if the mechanical treatment of Pott's disease at Sea Breeze that recumbency on the Bradford frame is the treatment of election for children under three years of age, for those with large deep abscesses or psoas contraction, and for those whose sinuses open in such a manner as to make a jacket impracticable. If the spinal disease be complicated by hip-joint or shoulder-joint disease, the frame will probably be the treatment of choice here also. The child spends the entire twenty-four hours on it, and is never permitted to sit or stand for an instant. In children over three years of age, the customary treatment is by the plaster jacket. If the disease is below the ninth thoracic vertebra and uncomplicated, the ordinary jacket is usually applied; if above the tenth, the Calot jacket is used. This the writer describes in detail. It must always be borne in mind that an infected abscess means in the majority of the cases the death of the patient. An abscess should not be allowed to emerge under Poupart's ligament and enter the thigh. A patient with a psoas abscess should be immediately placed in the recumbent posture on a frame, in order to avoid the effect of gravity upon the fluid. If the abscess be small and high up, it should be left alone, and possibly it may disappear spontaneously. If it be of large size and low down in the iliac region, it should be attacked in this situation and evacuated through a trocar and vacuum bottle. After it has been evacuated, and while the cannula is still in place, about seven to ten c.c. of fresh iodoform-ether mixture should be injected into the cavity. This should be repeated about every ten days until the abscess ceases to refill. Abscesses in the gluteal region or those that have already entered the thigh are not so satisfactory to deal with, but the earlier they are attacked the better.

Oral Administration of Antitoxins.—C. T. McClintock and W. E. King (*Jour. Infect. Dis.*, Feb. 18, 1909) state that toxins and antitoxins when given by mouth are usually rendered inert by the digestive processes. Their therapeutic or immunizing value is uncertain and not to be relied upon. If digestion is inhibited, which may be readily accomplished by the use of appropriate drugs, toxins and antitoxins are absorbed unchanged and apparently in sufficient quantity and with such uniformity as to warrant the use of this method for therapeutic and immunizing purposes. In treating children with antitoxin per mouth, the following method has given uniform and satisfactory results. One-half hour before administering the serum the child is given one glass of 1 per cent. sodium bicarbonate solution. When the antitoxin is given there is added to it one minim of fluidextract opii and from four to ten minims of saturated solution of salol in chloroform. When possible, no food should be given for at least four hours before administering the serum. In the nineteen children and hundreds of animals used in the writer's experiments, there was no evidence of any "serum sickness" or anaphylaxis. The authors believe the oral method of administering antitoxins of tetanus and diphtheria is the preferable one for prophylaxis: *a*. On account of the absence of danger and the ease of administration; *b*. because the cost may be very materially lessened. The hypodermic method of administering sera for curative purposes is the only one to be recommended unless extensive clinical experience should show that the oral method is equally efficacious. A relatively high degree of immunity may be produced in animals by the oral administration of toxins if the absorption of the same is promoted by such means as suggested above.

Congenital Inspiratory Stridor.—J. von Bokay (*Arch. de Méd. des Enf.*, June, 1909) gives the histories of three cases of congenital inspiratory stridor, and states his conclusions as to its cause. He disagrees with Hochsinger, who considered it due to pressure on the trachea by an enlarged thymus gland. The author believes it due directly to changes in the shape of the epiglottis, which becomes curved at its edges. In the author's cases there was no enlargement of the thymus gland. There was a neurotic diathesis with failure of coordination, and modification of the position of the aryepiglottic folds, which he considers to be the primary condition. The lumen of the trachea is normally oval with the large axis transverse. Hardening of the tissues causes contraction of the lumen.

Metabolic Osteoarthritis.—P. W. Nathan (*Amer. Jour. Med. Sci.*, June, 1909) says that the characteristic clinical phenomena of this affection are: a polyarticular disease involving the peripheral joint first, with a marked tendency to be symmetrical; a gradually progressive course, new joints being involved from time to time; joint swelling followed by gradually increasing deformity, and radiographic findings of a peculiar punched-out rarefaction in the early stages and absorption and distortion at a late period, without the presence of proliferative processes or bony ankylosis. He believes that metabolic osteoarthritis is a distinct pathological condition of the joints which can easily be recognized clinically, but not a primary joint disease causing secondary general symptoms. Neither does he think that a uniform specific general disease is responsible for this affection. It occurs in connection with a number of distinct clinical conditions, some of which are known to be specific diseases. His conclusion is that the joint disease is not due directly to the conditions with which it is associated, but is the result of their deleterious influence upon the general nutrition. Because of the reported effect of the thymus upon the development of the bones, he has employed the extract of thymus gland in these cases. Beginning with two five-grain tablets thrice daily, he increases the dose in two weeks to three tablets, and after a few months gives three tablets four times a day The patient is kept at rest until all symptoms of active joint disease have subsided. Passive motion of all affected joints is then begun, carefully at first and gradually increasing until the arc of motion is limited only by the shortened tendons. Massage is unnecessary and may even be harmful. The patient is then gradually gotten onto his feet. In this effort a persevering intelligent mother can usually do more with a child than anyone else. As soon as the patient is able to be upon his feet or use his joints without the appearance of joint irritation, all contracted tissues are divided with the tenotome and the deformity corrected. Immobilization for three or four weeks with light plaster-of-Paris bandages does not preclude the use of the lower extremities with the aid of crutches or a cane after a few days. With this treatment, the writer claims all but the most severe cases which have existed for a long time can be definitely improved. He does not, however, consider the thymus extract a specific for this condition. The value of the disease, as discussed at length in his paper, precludes such an idea. Moreover, the fact that in children the enlargement of the lymph nodes, liver, and spleen is not at all affected, although the joint condition is markedly improved, shows conclusively that its action is not specific as far as the original constitutional condition is concerned. The thymus acts simply as a stimulant to the nutritive processes, and probably in a measure counteracts the deleterious influence of the causal condition.

Infantile Paralysis of the Muscles of the Foot; its Treatment by Partial Arthrodesis.—Ch. Ducroquet and Paul Launay (*Presse Méd.*, June 30, 1909) say that one of the principal difficulties met with by the surgeon after tendon grafting to supply the place of the paralyzed muscles, is the inability to tell just how much force will be exerted by the accessory muscle grafted on, and the constant failure of the sole of the foot to touch the ground evenly, the foot being generally tilted to one side, giving varus or valgus. To obviate this bad result, which prevents the child from walking in the normal manner, the authors propose an operation which they call arthrodesis, in which the calcaneo-astragaloid articulation and the medio-tarsal articulations are opened, the articular cartilages removed, and ankylosis of the joints caused, to prevent rotatory movements of the articulations, and to permit only the movements of flexion and extension. The sole of the foot is then planted firmly on the ground, and only a slightly stiff motion at the ankle is left. The operation for this purpose is carefully and fully described and examples of the operation are given, showing what excellent results have been obtained in actual cases.

Etiology of that Dislocation of the Hip Commonly Called Congenital.—Ralph Thompson (*Proc. Roy. Soc. Med.*, June, 1909) states that the diagnosis of "congenital dislocation" is based upon the following evidence: (1) A few dissections of congenital dislocation; some of these occur in monstrosities, and therefore are of little value as evidence. (2) Clinical evidence of very young cases. (3) Deductions made by authorities from certain specimens which are considered to show characteristics of congenital dislocation. The occurrence of deformity in the intrauterine period of the child's life fails to explain the great frequency of cases occurring in female patients. Specimens of full-term fetuses and skiagrams of children taken during the first year of life show that not only is the female hip-joint working at a great disadvantage, but that when the erect attitude is adopted the joint is decidedly weaker than the male joint. The acetabular margin is of much greater importance in the female than in the male. Congenital dislocation may be regarded as a part of the price women have to pay for having adopted the erect attitude. If these views are correct, those changes which are generally regarded by authorities as primary should be regarded as secondary. These changes may be thus summarized: The acetabulum is shallow or even filled up with cartilage or bone; the acetabulum is triangular; the iliac segment of the acetabulum is deficient; the "os innominatum" is generally small; the head of the femur is flattened and smaller than usual; the neck of the femur is short and anteverted; coxa valga; hour-glass constriction of capsule of joint; stretched or absent "ligamentum teres"; shortening of leg below the knee. The writer explains these conditions in the order named as follows: If the head of the femur is not in its socket, that cavity becomes filled up with the growing cartilage of the acetabulum. If the head of the femur is dislocated, the acetabulum, following mathematical laws, becomes triangular. The deficiency of the iliac segment is due to pressure upon its outer, not its under, aspect. The generally small "os innominatum" is due to lack of development following upon the dislocation, and is to be associated with the shortening which occurs below the knee—a condition commonly found after excision of the hip. Flattening of the head of the femur is produced during dislocation. The epiphysial bone is perhaps later in appearance in the female than the male. The neck of the fetal and infantile femur is normally short and strongly anteverted. Coxa valga is due to the alteration in the planes of pressure passing through the femur. Traction upon the capsule, plus atmospheric pressure within the joint, produce constriction of the capsule. Traction put upon the ligamentum teres stretches it.

Treatment of Anemia in Infancy with Citrate of Iron given Subcutaneously.—J. L. Morse (*Bost. Med. Surg. Jour.*, July 10, 1909) considers that iron is especially indicated in the anemias of infancy. This is doubly true because milk contains a relatively small amount of iron. It is rather difficult to get infants to take sufficient amounts of iron by the mouth. Iron by the mouth is also very likely to disturb the digestion. In severe cases, therefore, it is often very advantageous to give iron in some other way. Iron may be given to infants subcutaneously without injury. A very serviceable form of iron for subcutaneous use is the aqueous solution of the citrate. This can be put up in pearls and sterilized, each pearl containing a single dose. When prepared in this way it remains sterile indefinitely. This solution is absolutely nonirritating and is never followed by induration or abscess if the injection is properly given. The injection is, however, sometimes followed by pain lasting from a few minutes to an hour. A glass syringe with asbestos packing, which can be sterilized, is necessary. The needle must be of platinum, as the solution corrodes the ordinary steel needle. The average dose during infancy is three-fourths of a grain every other day. The results are more marked and are obtained more rapidly than when the iron is given by mouth, and there is much less danger of disturbing the digestion. The subcutaneous use of iron is especially indicated in severe cases of secondary anemia with disturbance of digestion and in those of the chlorotic type.

Hypogenetic Enuresis.—Prosper Merklen (*Tribune Méd.*, July 4, 1909) says that among infants affected with essential enuresis there are often to be observed signs of a motor debility of the inhibitory muscles of the bladder and urethra, which is allied to hypogenesis of the pyramidal system. We may thus isolate from the group of essential enuresis a group of cases of hypogenetic enuresis. This is the expression at night and intermittently of a continuous condition of hypotonia of the vesicular musculature, in which the power of inhibition is very slight. This same lack of tone is noticeable in the lower extremities. The author studied 164 children from three to fifteen years of age, and of varying intellectual development. Of these there were forty-eight with weak motor systems and 116 normal children. Of the 116 normal children but eight showed enuresis, while of the forty-eight feeble children there were eighteen who had this symptom. Reversing this method, out of twenty-six cases with enuresis there were eighteen feeble children. The easiest way of diagnosing this debility is to raise the legs of the child into flexion, when cataleptiform attitudes are maintained by cases with enuresis.

Adenoids and Nocturnal Enuresis.—Leonard Williams (*Brit. Jour. Child. Dis.*, June, 1909) claims that adenoids and nocturnal incontinence do not stand in any causal relationship to one another, and that when they happen to be associated they are due to a common cause, namely an insufficiency of the internal secretion of the thyroid gland. The majority of the writer's cases of enuresis which were successfully treated by thyroid extract showed a subnormal temperature at the outset, and the temperature gradually rose to normal as the incontinence subsided. This depression of temperature, especially of nocturnal temperature, is a marked and characteristic feature of complete myxedema, and it is therefore not surprising that it should appear to some extent in minor degrees of thyroid insufficiency. The majority of the children, when they first presented themselves, were undersized, and nearly all of them weighed considerably less than they should have done. Under thyroid treatment the gain in weight was astonishing. It may be laid down as a general rule that when a child is being treated by thyroid extract its weight should be ascertained and recorded at regular intervals. As long as there is a gain the remedy is doing good, but as soon as there is a definite fall the borderline of safety has been crossed, and the drug should immediately be suspended. The rule is subject to this reservation, that in children of a decidedly cretinoid type, during the brief initial period when the organism is ridding itself of myxedematous tissue the weight may remain stationary, and may even decline. The high-arched palate is very generally regarded as the result of deficient nasal respiration caused by adenoids. The writer maintains that it is one of the stigmata of thyroid insufficiency; that it is produced by the yielding of the palatine bones owing to their relative poverty in calcium salts, which, in turn, is due to an inadequacy of thyroid secretion. The same relative absence of calcium salts from the tissues, due to the thyroid insufficiency from which they were undoubtedly suffering, probably explains another feature which was very noticeable in the incontinent children, dental caries. Léopold-Lévi and H. de Rothschild call attention to a sign of thyroid insufficiency to which they attach the name of "the eyebrow sign," a rarefaction, sometimes complete absence, of the hair of the outer third of the eyebrow. The diagnostic value of the sign may be stated as follows: Deficiency of the eyebrows, even when the deficiency is confined to the outer third, affords a very strong presumption in favor of thyroid inadequacy, and should always lead to a careful search for confirmatory evidence, such as urinary precipitancy, subnormal temperature, a Gothic palate, carious teeth, urticaria, mental and physical lethargy. On the other hand, perfectly developed eyebrows are by no means incompatible with a high degree of thyroid inadequacy, as shown by persistent nocturnal enuresis and abundant adenoids. Regarding signs of intolerance of thyroid extract, the writer affirms that one of the most significant symptoms of thyroid excess is the more or less sudden occurrence of a catarrh of considerable severity, usually confined to the nose. He regards its appearance as a warning to suspend the treatment. So long as subnormal temperature persists, the drug may be continued; as soon, however, as the temperature reaches normal, caution is necessary; and at the first indication of a rise beyond normal, the drug must be suspended.

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THE TREATMENT OF RETRODISPLACEMENTS OF THE UTERUS.[1]

WITH BRIEF REPORT OF ONE HUNDRED AND THREE GILLIAM OPERATIONS.

BY
W. H. HUMISTON, M. D.,
Cleveland, O.

I FULLY appreciate the high honor you bestowed upon me in electing me president for this year. Coming as it did during my enforced absence from the Baltimore meeting I feel more fully than I have words to express the honor and compliment you have paid me, and I have, and shall continue to give, the office the time and care it so richly deserves. Pray accept my heartfelt thanks.

Probably not a person who is a member of this association has not well settled convictions as to the best method of treating uterine displacements, but there are many others who do attempt the treatment of these cases without affording relief, and in many cases by manipulative violence convert a simple condition into a complicated one.

Our proceedings are published and are read and digested by thousands who practise medicine and surgery, and it is my hope to so present a few thoughts on this subject that it will stimulate a comprehensive discussion, and be helpful to the general profession. This subject has received a great deal of attention from gynecologists for years and a great many operations have been described and practised for the restoration of the retrodisplaced uterus. Many of the operations were found to be deficient and insecure after repeated trials. Others substituted an abnormal new position for the one found to be corrected, and if pregnancy occurred labor at or before term was complicated.

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[1] The President's Address delivered at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

I have come to divide the cases of retrodisplaced uterus into two classes: a smaller one in which active major surgical measures are not required to obtain a cure, and a larger one in which active surgical procedures are necessary.

In the first group are all those cases of retroversion of not long standing and in which there has been no infection or inflammation of the appendages. Most cases of this group that I have seen have been those in which miscarriage or labor had recently occurred.

The prominent symptoms presented were backache, occipital headache, bearing down feeling while in upright position, frequent but not painful micturition, constipation, disturbed digestion, and an increasing nervousness. Menstruation increased in amount and frequency but was not as a rule painful. Some leucorrhea was always present. Digestive disturbances were usually prominent.

Bimanual examination as a rule revealed injury to pelvic floor and perineum, cervix lacerated, swollen and in axis of vagina. Cervix easily reached with finger, and a continuous resisting *body* from posterior wall of cervix as far as finger can reach, which is movable. Ovaries can be palpated and are movable and but little increased in size. Fundus of uterus absent in front.

Such cases as above described are ideal for the surgeon who resorts to the Alexander operation, and should be successful, providing he resorts to curettage, trachelorrhaphy and perineorrhaphy before shortening the round ligaments.

But I claim and have demonstrated it time and time again that these cases of retroversion without complication can be cured by curettage, trachelorrhaphy, replacement of uterus, well fitting pessary adjusted, and the pelvic floor and perineum repaired by a method that will insure a muscular restoration of the parts. I am not now describing a case of retroflexion when I make the claim of cures for the above procedures. A pessary can not hold a retroflexed uterus in normal position.

I use the pessary only as a temporary aid keeping the uterus forward where manipulation has placed it until involution occurs and the structures outside of the uterus have regained their tonicity and function. The average length of time the pessary is required is twelve weeks, when it can be removed and the uterus will remain in normal position. In several cases pregnancy has occurred before the pessary was removed.

Unfortunately we have but few of the uncomplicated cases, as 90 per cent. are complicated when we specialists see them, and in addition to above operations the abdominal cavity is opened and the diseased conditions found dealt with. The appendix is quite frequently found diseased and is of course removed, and the operator's work ended by shortening the round ligaments by the Gilliam method.

The Gilliam method is comparatively simple and its results are enduring and satisfactory. The results I have attained in 103 cases in three years are highly satisfactory as I have had no deaths in the series, nor have there been complications at delivery in those that became pregnant. All were delivered without artificial aid excepting in one case where low forceps were used. No connection. could be traced between the Gilliam operation and the procedure.

It is rare indeed that we do a Gilliam operation alone, for usually some complication will be found necessitating additional surgical procedures.

RESUME OF 103 CASES OF THE GILLIAM OPERATION.

Gilliam operation with resection of one ovary	15 cases.
Gilliam operation with resection of both ovaries	2 cases.
Gilliam operation with removal of one ovary	37 cases.
Gilliam operation with removal of both ovaries	19 cases.
Gilliam operation with removal of one ovary and resection of other	20 cases.
Gilliam operation and appendectomy alone	10 cases.
Total cases	103

The number of appendectomies performed in the series was 43.

Gilliam operation with appendectomy alone	10 cases.
Gilliam operation with appendectomy and resection of one ovary	5 cases.
Gilliam operation with appendectomy and resection of both ovaries	1 case.
Gilliam operation with appendectomy and removal of one ovary	12 cases.
Gilliam operation with appendectomy and removal of both ovaries	7 cases.
Gilliam operation with appendectomy and removal of one ovary and resection of other	8 cases.
Total cases	43

The number of appendectomies is rather surprising but I removed none that had not the appearance on careful inspection of being diseased.

I desire to report in detail three cases of retrodisplacement of the uterus. These three cases are of interest as they present a wide range of symptoms and suffering.

CASE I.—Retroversion attended with melancholia, and a determination to destroy life.

Mrs. S., aged twenty-seven, married two years; one child at term, living. Normal delivery June 8, 1908.

Menstrual history—began at the age of fourteen; regular twenty-eight day type. No pain, quantity free, duration six days. Last period January 1, 1909, seven months after birth of child; attended with much pain and marked nervous depression, sleeplessness. General appearance anemic, weight ninety-seven pounds. Headaches severe; sleep poor, disturbed; appetite impaired; digestion weak; bowels constipated; urination frequent but not painful. Complains of occipital headache, severe pain between scapulae and in right lower quadrant of abdomen. Bearing down feeling when on feet and increase of pain in head and back. Has no desire to live and is in a state of hopelessness.

History of development of present condition: nervous and irritable during the last months of pregnancy, but since delivery has been much worse. Pain in right iliac region was first noticed when she got up after the puerperium and is constantly increasing in severity. The general previous history is good; had pneumonia when a child. Family history negative.

Examination shows heart and lungs normal, urinary examination negative. Abdomen normal except as to pain on pressure over lower quadrants. On inspection the vaginal outlet and perineum were torn; a good sized rectocele existed. Bimanual examination revealed a roomy vagina, cervix in axis of vagina bilaterally lacerated with eversion and erosion. Uterus large and retroverted, tender on pressure, but movable. Right ovary prolapsed, somewhat enlarged, painful but movable. Left ovary palpable, normal in size.

Patient entered hospital January 18, 1909, and was prepared for operation January 20. Ether anesthesia, uterus curetted, cavity four and a half inches, double trachelorrhaphy performed, uterus placed well forward and a Smith pessary adjusted. Perineorrhaphy was then made, sphincter ani dilated and adhesions of clitoris freed. Patient put to bed in good condition. Canvalescence normal. Microscopical examination of uterine scrapings revealed an interstitial endometritis.

February 7, 1909, the patient left the bed; condition greatly improved, nervousness and depression disappeared, appetite good and gaining strength. Sleeping quite well. Began to enquire for her baby and was anxious to go home. Former condition of almost constant depression and lack of hopefulness replaced by a much more cheery disposition. Was dismissed from hospital on February 9 and returned home.

The patient had been home but a short time when her baby became ill and after a fortnight died. The care of the baby and the grief at its death produced a shock which temporarily checked her improvement. She was sent to her mother's home in the country and remained there several months returning to Cleveland in August feeling well and had regained normal weight. I examined her September 15 (she had removed the pessary in July) and found the pelvic organs in normal position and condition. Her appearance was healthy; was cheerful in disposition and free from pain. Is now helping her young husband, a bank clerk, to pay the indebtedness of her long illness by teaching music. I feel I am justified in claiming a cure for this case through the minor operations and the pessary.

Case II.—August 8, 1907, Mrs. P., aged twenty-seven years, married, one child at term, living and four years of age, one at seventh month, lived two days, two years ago. One miscarriage at five months in June, 1907. Referred to me by Dr. Barricelli. General appearance anemic, weight 100 pounds. Headaches, sleeps poorly, appetite poor, digestion disturbed, bowels constipated, urination frequent, leucorrhea present. Complains of constant pain and a swelling in right lower quadrant in region of old appendectomy scar. History of development of present condition: was operated for an appendicial abscess by a general surgeon three years ago after forty days' sickness at home, during which time she had high fever and pain in right side. The previous history good, and the family history negative.

When she entered the hospital she had fever, quickened pulse rate, and was suffering pain in the region of the scar in right inguinal region. On examination it was evident an abscess was about to discharge at this point. A tear of the vaginal outlet and perineum was found, cervix slightly lacerated; uterus in axis of vagina, a large mass in culdesac and right vaginal vault, high up, elastic and painful; left vaginal vault free. The next day, August 9, the abscess opened through the scar and discharged a thick creamy pus, no fecal odor.

On August 10 I enlarged this opening and put in a tube and gauze drain. Large quantities of pus came away and continued for days. Patient improved and I let her go home to return later for a radical operation. The abscess was kept open with gauze drain. Returned to hospital October 16, 1907. General appearance better, no fever, but fistulous tract open and discharging a small quantity of creamy pus. She was prepared for operation October 17, ether anesthesia, uterus curetted, cavity three and a half inches.

The abdomen was opened, extensive adhesions of omentum separated and a large portion ligated and removed. This uncovered a large mass to right and above uterus. Extensive adhesions of intestines were separated and the mass was found to be a large tubo-ovarian abscess with the distal end of appendix attached thereto. With considerable difficulty the mass was freed and rolled out and was removed with a V-shaped portion of right uterine wall cut out. Appendix removed, and the V-shaped cut in uterine tissue united with catgut. Left tube congested, otherwise normal; left ovary cystic, punctured. The uterus was firmly adherent to rectum, and when separated left the gut denuded of peritoneum. The uterus was brought well forward and retained by the gauze drain used.

A Mickulicz gauze drain was placed so as to protect the denuded surface and keep the uterus forward, and the incision closed down to the drain. Submammary injection of normal saline solution was given during operation and about two litres were used. The patient was put to bed in fair condition, without shock. One week later, October 24, fecal matter freely discharging through opening, the gauze was removed and a less quantity substituted. Patient's condition good. November 30, the abdominal opening was entirely closed and patient was dismissed. May 18, 1908, the patient returned, looking well, suffering no pain of any kind, and reported a gain in weight of thirty-five pounds; was menstruating regularly.

October 18, 1908, patient returned complaining of pain in left lower quadrant of abdomen. Cessation of menses since July 21, nearly three months. Examination revealed the cervix in axis of pelvis, softened, uterus enlarged in size to correspond to a three months' pregnancy. December 21, 1908, patient again presented herself, complaining of pain along site of old incision. She looked well and said she felt fetal motion. February 2, 1909, Dr. Barricelli reported patient surely pregnant and feeling well.

May 10, 1909, Dr. Barricelli reported that patient gave birth to a male child weighing twelve pounds on May 7. Labor began at 5 P. M., was normal with delivery at 11 P. M. Placenta was expelled and firm uterine contraction maintained. May 13, the baby was thriving at the breast, and the mother was having a normal convalescence.

September 18, 1909, I went with Dr Barricelli to visit and examine this patient. Found her looking and feeling well. Able to do all her household work and nursing a healthy looking baby four months old. The patient weighed 160 pounds and was robust and entirely free from her former serious diseased condition. Pelvic examination revealed a slight tear of perineum, vagina normal, cervix small, in axis of pelvis, slight unilateral tear. Vaginal vaults free. The uterus was in normal position, normal in size and mobility not impaired. A small ventral hernia produced by the gauze drain was giving no symptoms or discomfort to the patient.

CASE III.—Complete prolapse of uterus. Mrs. W——, aged twenty-five, married five years, two children both living, no miscarriage. Menses began at seventeen, regular twenty-eight day type, duration four to five days, normal amount, pain during flow located in lower abdomen and in small of back. The patient came to hospital November 1, 1907. Complaining of dull constant pain in lower abdomen and backache. Dragging sensation marked, the uterus coming down when on her feet and causing difficulty in walking. Patient gave birth to child in March, 1907, and was badly lacerated. Present trouble began three months ago when uterus began to appear in vagina, was replaceable, and has now complete prolapse.

Operation was done November 4, 1907. The uterus was curetted and cervix repaired; anterior colporrhaphy and perineorrhaphy. Abdomen was opened in median line and Gilliam operation performed. Patient was put to bed in good condition. She developed a lobar pneumonia the second day and it ran a severe course for two weeks, but she finally recovered and was dismissed from hospital December 6, 1907. December 8, 1908, patient presented herself at dispensary and was seen by Dr. Bolt. She was apparently two months pregnant and in good condition.

July 19, 1909, patient was delivered of a seven and a half pound girl baby by Dr. Bolt. Persistent occiput posterior, delayed completion of second stage of labor and the head was rotated with forceps and extracted. Laceration of perineum was immediately repaired and recovery was uneventful.

September 17, 1909, I saw the patient with Dr. Bolt. Her general condition was excellent and she was nursing a strong healthy baby. However, she was out of bed too early following confinement and with her arduous duties began to have prolapse of uterus which she neglected for several weeks. Dr. Bolt was then called and replaced the uterus and fitted a pessary which holds the organ in position. The perineum is faulty, with no muscular support to pelvic floor; quite a large rectocele exists; uterus is small, freely movable and appendages normal.

The pelvic measurements made on above date are:

Intercristal	26 cm.
Interspinous	22 1/2 cm.
External conjugate	19 cm.
Left oblique	21 cm.
Right oblique	21 1/2 cm.
Internal conjugate	10 1/2 cm.
Interischial tuberosities	7 3/4 cm.

This indicates a general narrowing of the whole pelvis. It is also the first Gilliam failure I have noted following labor. The cure was complete and remained so until labor took place.

536 ROSE BUILDING.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

(*Abstract of the Proceedings of the Twenty-second Annual Meeting, held at the Hotel Anthony, Fort Wayne, Indiana, September* 21, 22 *and* 23, 1909.)

The President, Dr. William H. Humiston, *of Cleveland, Ohio, took the chair at* 9.30 a. m.

An address of welcome was delivered by Dr. H. A. Bruggemann, President of the Fort Wayne Medical Society, which was responded to by Vice-President Dr. James Edgar Sadlier, of Poughkeepsie, New York.

ADVANTAGE OF THE COMBINED INTRA- AND EXTRA-PERITONEAL URETEROLITHOTOMY FOR THE REMOVAL OF STONES FROM THE LOWER URETER.[1]

BY

ERNST JONAS, M. D.,

St. Louis, Mo.

(With one illustration.)

Until a few years ago and perhaps up to the very present, without doubt not a few appendices have been removed for so-called chronic appendicitis. Vague gastric disturbances and a moderate degree of local tenderness around McBurney's point were considered sufficient to warrant the diagnosis of chronic appendicitis and justify the consequent removal of the appendix. No wonder then that the diagnosis frequently proved erroneous. It was a time, when we were inclined to accuse the appendix as the cause of all kinds of abdominal troubles. Now, the pendulum of opinion swings in the opposite direction and, in those cases in which no distinct spell of acute appendicitis has been observed, the conscientious surgeon is inclined to regard the appendix as not guilty until he can definitely prove it to be the cause of the trouble. Justly, in these cases (without a positive acute attack of appendicitis), we demand a most painstaking physical examination before returning the verdict chronic appendicitis and recommending removal of the appendix. Again, justly in these cases, we demand repeated thorough examinations of the urine (the catheterized specimen in women) in order not to overlook traces of blood, red-blood corpuscles, the presence of which points strongly to the diagnosis of stone in the kidney or ureter.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Especially some time after the patient has experienced pain or after firm palpation of the tender spot, the urine is likely to show traces of blood which may have been absent during the spell itself. With evidences of blood, macroscopical or microscopical, in the urine the next step is an x-ray examination to be followed by cystoscopic examination and catheterization of the ureters. A skiagram of the kidney and ureter, to be of practical value, must show a shadow of structures less dense than the least dense calculi, phosphatic and uric acid.

A good x-ray picture must show distinctly the processus transversi of the vertebral column and the structure of the last rib and crest of the os ileum; it should also show the oblique course of the psoas muscle and perhaps the quadratus lumborum. If plates of such character do not show any shadow in the region of the kidney and ureter, it is fairly safe to exclude a stone in the kidney or ureter. To skiagraph the kidney and the whole length of the ureter demands, as a rule, four good pictures from each side, and both sides should always be skiagraphed, if there is any suspicion of kidney or ureter stone. An x-ray shadow in the region of the ureter is, however, by no means a proof of a stone in the ureter. A phlebolith close to the course of the ureter (as observed by me in a case of cancer of the bladder) or a fecal concretion in the tip of the appendix may easily be mistaken for ureter stone. It is therefore safest not to rely on any one method, but to combine with the x-ray examination the cystoscopic examination and catheterization of the ureter.

An x-ray picture taken with the ureter catheter containing a wire stilet or filled with mercury makes the diagnosis an accurate one. I have no experience with wax-tipped ureter catheters. Having positive evidence of a ureter stone, we have still to prove that there is only one. Again we have to resort to the x-ray and it alone can aid us in deciding this point. A ureter stone being present, we should not allow more than two days to elapse before operation. If an operation cannot be performed within that time, another picture should be taken. This is a precaution against disagreeable surprises. Stereoscopic radiographs, taken after very thorough evacuation of the bowels, may give a fairly good idea of the relation of the stone to surrounding bony structures (Gibbons). Occasionally it happens that ureter stones not firmly incarcerated change their places, so that some days they are down low and can be palpated, while other days they are higher up and cannot be felt. This fact emphasizes the value of repeated examinations from the rectum or vagina.

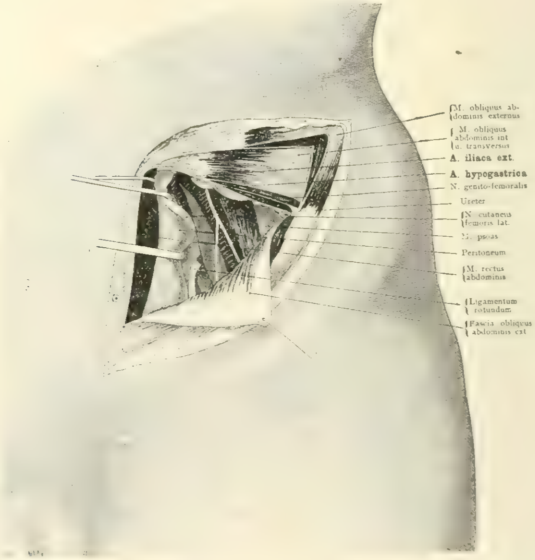

Fig. 1.—Surgical relations of the ureter.

Positive evidence of the ureter stone is at the present time almost generally considered, at least by the surgeons, cause for prompt surgical action. Although, as Deaver says, a calculus may remain lodged in the ureter indefinitely without producing serious symptoms, yet such cases are exceptional, and were such a calculus to be discovered by chance, it is questionable whether it would not be the surgeon's duty to remove it as a prophylactic measure. It can, I think, hardly be questioned, that the well known dangers which may ensue from neglect of ureteral calculus are much greater than those which attend its removal by operation. Even the remote possibility of development of cancer at the point of impaction is to be considered. The only exception for surgical interference is the class of cases, in which with each attack of kidney colic, a larger or smaller calculus is discharged. *X*-ray pictures between the attacks may, of course, be entirely negative. It is evident that in cases of this kind, the salvation of the patient lies in the proper hygienic and dietetic treatment combined with urinary antiseptics, a treatment which should always be adopted after operations on kidney or ureter.

The operative method for the removal of a stone from the ureter is less agreed upon, if, as is my object in this paper, we consider, in particular, stones lodged in the ureter during its course through the pelvis, that is, the lower ureter.

There are three locations in the ureter where a stone is liable to be arrested:

1. An inch and a half to two inches from the pelvis of the kidney as the ureter bends forward over the psoas muscle.
2. In the bend of the ureter about 1 to 2 inches below the pelvic brim. Deaver says, at the brim of the pelvis, where it dips down across the bifurcation of the common iliac artery.
3. In the vesical portion (just before the ureter passes into, or during its course through, the vesical wall—Morris).

The usual operative route for stones in the vesical portion (3) is intravesically, if the stone is lodged very close to the vesical orifice of the ureter. Where the stone is situated an inch or more from the bladder wall this method is not safe and the combined intra- and extraperitoneal method is to be recommended. Ureter stones lodged near the pelvis of the kidney (1) are best removed extraperitoneally through incisions as used for exploring the kidney. It is fairly a matter of choice, whether the stone be removed by incision through the kidney substance or directly through the pelvis of the kidney or by incising the ureter itself. The danger of urinary fistula from incision into the ureter is extremely slight, if the passage to the bladder is free. If drainage is desired, ureterotomy is not advisable. Direct drainage of the pelvis of the kidney is of course preferable, just as, in a case of stone in the cystic duct, we prefer to drain the gall-bladder by incising the gall-bladder itself and do not, unless unavoidable, drain through the cystic duct. And, since we believe that most ureter stones originate in the kidney pelvis, the pelvis of the kidney should be drained in almost all cases, even though conditions for natural drainage may be favorable.

The best operative method for stones in the lower ureter, that is from the point where the ureter crosses the common iliac artery to the vesical portion, is still under discussion. I believe with most surgeons that ureteral stones are mostly secondary. Primary stones, rare as they may be, must be due to a local cause, irritation, foreign body, kinking of the ureter, by adhesions, and the like. However, we possibly underestimate the frequency of primary ureter stones, since in the vast majority of cases only one stone has been found. If the kidney is the originator of the stones, why do we find so frequently only one? Formerly we believed that ureter stones near the pelvis of the kidney and near the vesical orifice were much more frequent than those in the lower ureter. With the aid of the *x*-ray, we have found that this is not true. They number perhaps 50 per cent. or more of all ureteral stones and had simply not been diagnosticated.

The operation must aim 1. to remove the stone or stones in order to avoid the well known dangerous consequences to the kidney, and 2. to prevent the recurrence of the stone.

If our sole object were to remove a stone from the ureter during its course through the pelvis, the following extraperitoneal method would suffice: a straight incision parallel to the external border of the rectus muscle extending from the semilunar fold of Douglas to the pubis. The peritoneum is not opened but pushed toward the middle line and, with it, as a rule, the ureter appearing as a whitish or yellowish whitish tape. It is surprisingly simple to expose the ureter in this manner from the brim of the pelvis to the bladder, about four inches in extent. Instead of making an incision in the linea Spigelii, it may of course also be made a little further inward. In that case, it exposes and splits the anterior sheath of the rectus muscle, the muscle itself being either cut or pushed aside. In view of the necessary drainage, this incision is, in my opinion, preferable to the low gridiron operation, since it interferes less with the muscular support of the abdominal wall. The removal of the stone is then usually an easy matter.

However, as stated, this method takes into consideration only the removal of the stone, and leaves entirely out of question the second point—the prevention of a recurrence of stone formation. It seems evident to me that the mere removal of a stone from the lower ureter does not in any way guarantee the complete cure of the patient and here, as always, it must be our endeavor to remove not only the effect but the cause (*cessante causa, cessat effectus*).

Morris attributes lodgment of a ureter stone in the bend of the ureter to the curve made by the ureter. The ureter stone near the pelvis of the kidney is also usually found where the ureter bends forward over the psoas muscle. Again, the lodgment of a stone may be due to narrowing or constriction of the ureter, the normal size at the three points from where ureter stones are usually found being 1/7, 1/4 and 1/10 of an inch respectively I fully agree that the origin of the majority of ureter stones is in the kidney and that they are merely arrested in the part of the ureter now under consideration. Some stones, however, are probably formed there. In the former instance, we have to explain the lodging of the stone in this particular place, in the latter, the origin and lodging at this particular place,—the widest of all three places just mentioned.

There is to my mind nothing more likely than that, in men, an inflammatory condition of the appendix, in women, a like condition or adhesions around tubes and ovaries or in connection with retroflexion of the uterus, might cause ureteritis or periureteritis, or produce a kink in the ureter, or at least increase the normal bend of the ureter at this point. In this way, small stones coming down from the kidney may be retained and increased in size *in loco* and, in this way, a ureter stone may begin to form about a small nucleus of mucus.

I therefore advocate an operation that permits the examination of these organs and the necessary steps for their reparation or removal. Such an examination can be satisfactorily made only after opening the peritoneal cavity, and, in my opinion, it should be made in all cases, especially, however, if the stone is on the right side, for then only can it be ascertained whether the appendix is diseased and whether adhesions around it are not indirectly to blame for the ureter stone. Before employing this technic, I had two cases in each of which I had to remove the appendix after having previously removed a ureter stone. The intraperitoneal beginning of the operation is of advantage not only for the above reason, but because in a great many cases the finding of the stone is made more easy. After locating the stone, the peritoneum, if infection be feared, may be closed at once but had better be kept open, as advised by Gibbons, to facilitate the removal of the stone with the aid of the finger in the peritoneal cavity. The finger is placed against the stone, the peritoneum pushed off from the abdominal wall and the stone removed extraperitoneally. The peritoneum is then closed and the rest of the incision sutured in the usual manner down to the lowest point, through which a drain, no unprotected gauze, is passed to (not into) the small opening in the ureter. A nick in the ureter wall is sufficient to permit the extraction of a good sized stone. It is advisable to push the stone up a little way from its lodging place so that the small cut does not strike the inflamed or ulcerated part of the ureter wall. I have never tried and do not expect to try, certainly not in men, to push the stone into the bladder, since the opening in the ureter heals very quickly. Frequently hardly any urine is discharged through the drain. It is certainly not advisable to attempt to suture the ureter, which necessitates lifting it from its bed and risking necrosis of its wall. Besides, it is entirely superfluous, since the small incision in the ureter heals as a rule very rapidly, usually in less than two weeks and the drain opening a few days later. Occasionally the stone in the ureter is only felt and the ureter not distinctly seen. That sewing in such a case is not possible is evident.

The proper treatment, then, for stone in the lower ureter is, in my opinion, a laparotomy which allows a thorough examination into possible causes for the lodging of the stone or for the origin of the stone *in situ;* removal of the cause, if found, intraperitoneally and then removal of the stone from the ureter extraperitoneally by pushing away the peritoneum as above described. That this method should of course be employed if the diagnosis is doubtful needs hardly to be mentioned and that a definite diagnosis cannot always be made needs not to be discussed. In spite of most painstaking examination some cases remain doubtful. That furthermore the combination of appendicitis and ureter stones is not rare is proved by cases reported in literature, Gibbons, Deaver and others, beside the two cases of mine before mentioned and two more cases in which I employed this method and removed a badly diseased appendix and ureter stone. In all these cases, the ureter stone was located about one and one-half to two inches from the pelvic brim. Positive evidence of a ureter stone, therefore, instead of causing us to exclude other diseased conditions in this locality, should make us suspicious of them. The only operation which answers all demands is the combined intra- and extraperitoneal uretero-lithotomy.

To summarize: the proper treatment for stone in the lower ureter is the combined intra- and extraperitoneal uretero-lithotomy. The intraperitoneal part of the operation serves for exploration and for the removal of conditions which are possible etiological factors in the lodging and formation of stone. It also frequently makes the finding of the stone easier. The extraperitoneal steps serve for the removal of the stone.

Stones higher up, at the crossing of the ureter and the iliac vessels can be removed by this combined route, as described and first emphasized by Gibbons. Should it be difficult to push the peritoneum back far enough, it might become necessary to add McBurney's gridiron incision. In this way, a flap is formed which gives complete access to the whole ureter from its point of crossing with the iliac vessels to the bladder. The shape of the entire incision is analogous to the cut described by Fowler for the extraperitoneal removal of ureter stones in the lower ureter and now frequently advocated for the ligation of the common iliac artery.

465 N. TAYLOR AVENUE.

DISCUSSION.

DR. JOHN YOUNG BROWN, of St. Louis, stated that in his own work and in watching that of others he had frequently been impressed with the fact that the appendix in many instances might be removed when macroscopically there seemed to be absolutely no indication to show it was at fault. If we would consider the anatomical relationships of the appendix and ureter as he had been doing in the last year by cross-section work, by injecting the appendix with bismuth, and by skiagraphic work, as was done in all cases sent to his clinic with a diagnosis of appendicitis in which he had found stones in the ureter, the appendix not being found particularly at fault, it would make an interesting series of cases. He did not know of any condition which was more difficult to differentiate than certain forms of chronic appendicitis and stones in the ureter. In the last year he had had nine cases, three of which had been in doctors in whom the differential diagnosis was very difficult. One physician two years ago had an attack which was diagnosticated at the time as mild appendicitis.

Examination of the urine showed a considerable amount of blood. A skiagraph was taken and what was supposed to be a stone in the ureter was found. This physician congratulated himself that he had a stone in his ureter rather than appendicitis. Attacks subsided quickly and he went along with reasonable comfort for some months when he had another attack which was more severe. There was no leukocytosis, but the urine still showed the presence of blood and an additional skiagraphic examination showed what was supposed to be a stone in the ureter. This physician then attended a meeting of the State Medical Society and while there had a fulminating attack of what was considered appendicitis and which afterward proved to be such. He still had blood in his urine, but refused to be operated on. What was supposed to be a stone in the ureter turned out to be a concretion in the appendix. He was then operated on, the appendix removed, which was retrocecal. The symptoms pointing to stone in the ureter and blood in the urine were brought about by contiguity of the ureter with the condition in the appendix.

The speaker recalled the case of a doctor's brother who was sent to him with a diagnosis of appendicitis. He made a careful examination, found blood in his urine, took a skiagraph and found a shadow which seemed to indicate that there was a stone in the ureter. He did a combined operation and not only removed a stone from the ureter, but found the appendix adherent to the right ureter and he was inclined to believe that probably the condition around the appendix had a good deal to do with the development of the stone in the ureter. If he had removed the stone in the ureter and had failed to open the abdomen and remove the appendix, he thought he would not have given him the relief that he got from this operation.

A very important point in Dr. Jonas's paper was that we should make a careful analytical diagnosis in all cases of so-called chronic appendicitis. It had impressed him forcibly that many, many appendices were removed when the trouble was not in the appendix at all, and he thought in justice to the profession and to the patients that surgeons had no right to open the abdomen of any man or woman for the removal of the appendix until a careful differential diagnosis had been made, this diagnosis including not only a careful urinary analysis, but if the urine showed any evidences of blood a cystoscopic examination should be made and skiagraphs taken with a view to controlling the work done by the catheter introduced into the ureter.

DR. ALEXANDER HUGH FERGUSON, of Chicago, said the surgery of the lower ureter was comparatively recent. The first case he had encountered of stones that were demonstrated in the ureter was one where the kidney had been completely destroyed by stones, and these stones filled the ureter from the kidney to the bladder. It was his function to remove the remains of that kidney and the entire ureter. This was done in 1895. He preserved the specimen which he still had. He had brought with him a photograph of the condition, thinking it might be of interest to the members while they were discussing the subject of stones in the lower portion of the uterer (Plate I). The stone at the neck of the bladder was of such a size

PLATE I

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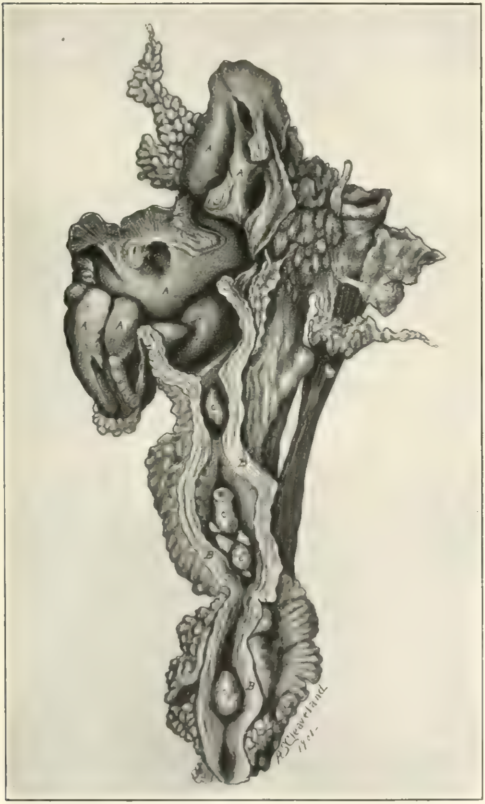
DISEASES OF WOMEN AND CHILDREN
NOVEMBER, 1909



Nephro-Ureterectomy. A. Remains of kidney. B. Entire ureter containing stones. C. Stones.—Ferguson.

that it could not pass through. The immediate result of the removal of this kidney and entire ureter was very good, although before he did it he had to open the opposite kidney for a pyonephrosis, and he did this operation under gas anesthesia.

A man from Winnepeg presented himself at the Chicago Hospital on September, 1909, with the following history: four years ago he had a very severe attack of nephritic colic in the left kidney. He was laid up two weeks and since then had had several minor attacks, referred to the region of the ureter. The patient was a healthy man of fifty-eight years.

The radiographs showed a stone in the lower end of the left ureter between one and two inches from the bladder. The sound and cystoscope revealed nothing of the nature of calculus in the bladder. The left ureteral orifice protruded somewhat and was a trifle redder than normal. The patient was given, besides the usual preparation for laparotomy, urotropin and methylene blue. The anesthetic (ether) was given by the drop method.

A skin incision was made directly over the external ring, extending upward along the course of the inguinal canal for five inches. The aponeurosis of the external oblique muscle was opened freely, exposing the entire inguinal region and internal oblique muscle. The internal abdominal ring was enlarged, without opening the peritoneal cavity. The transversalis fascia was severed along the entire length of the incision, exposing the deep epigastric vessels which were ligated and cut. The vas deferens was taken as the guide to the ureter. It was followed by blunt dissection to the base of the bladder. The sigmoid and small bowel were pressed toward the median line by gauze sponges. To obtain sufficient room to admit the hand, the origin of the internal oblique and transversalis muscles was severed from Poupart's ligament for a distance of two inches. This afforded sufficient room to reach and explore the ureter from the pelvic brim to the base of the bladder. The stone was felt in the ureter; an effort was then made to milk it into the bladder and toward the kidney; both these measures proved impossible.

An incision was made into the ureter, parallel to its long axis, about one inch below the brim of the pelvis; a stout catgut ligature had been passed around the duct as a guy-rope. The ureter was empty; there was no staining of the tissues with methylene blue. It was thus evident that anuria existed in the left kidney. An olive, flexible bougie was passed into the ureter and the stone located. The grating of the probe against the stone could be distinctly heard. Another attempt was made to shove the stone into the bladder; it was unsuccessful. Then a long curved alligator-jawed forceps was passed into the opening in the ureter. The stone was seized in its blades and carefully extracted. The entire course of the ureter from kidney to bladder was now explored and found perfectly clear.

No attempt was made to suture the ureter. The loose tissues on either side of the wound were drawn together and the same suture caught about a gauze drain, covered with rubber tissue. This drain was brought out at the upper angle of the wound. The cord was left behind the transversalis fascia. This structure, with the transversalis and internal oblique muscles, were sutured to Poupart's ligament. The lower angle of the wound was drained with a cigaret drain which passed down to the side of the bladder. The external oblique was closed with continuous catgut suture, and the skin with silkworm-gut sutures. A catheter was passed into the bladder to keep it empty.

The operative procedure varies in accordance with the side of the body. If colicky attacks were on the right side we should always think of the appendix, yet this was not simply an excuse but an indication for opening the abdomen. If the attacks were on the left side and the patient was a man, there was no indication for opening the abdomen to remove such a stone in his opinion, because it could be done more safely without the complication of an additional cut in the peritoneum. In women these stones could be reached through the bladder when they were low down, depending on their size, and so on.

Dr. H. W. Longyear, of Detroit, spoke of the differential diagnosis between pain in the ureter and pain in the appendix. He had seen a great many operations performed for the removal of appendices that were no doubt unjustifiable and they were prompted by pain in the ureter under a mistaken diagnosis. There were cases of what one might call storms of uric acid coming from intestinal toxemia. Large quantities of uric acid were given off from the kidney and passed down the ureter, causing the ureter to become inflamed and thereby producing pain. When the pain was on the right side it was apt to be mistaken for appendicitis and the temperature coming from the toxemia simulated it still more. These cases should be examined very carefully, so that such mistakes could not be made.

He was called by telegraph to northern Michigan during last winter to operate on a case of supposed appendicitis, but on arriving there found it was one of those cases of uric acid impaction in the ureter following intestinal toxemia. A good course of antiseptic treatment, cleaning out both the urinary and alimentary canals, relieved the patient in three days. In these cases there were blood cells in the urine, considerable uric acid and mucus, but the previous history of the case indicated the intestinal origin of the trouble. These cases were very puzzling and the differential diagnosis was not easy.

Dr. Miles F. Porter, of Fort Wayne, said there was just a point or two he would like to emphasize concerning the colics which occurred in the kidney that were due to the passage of blood clots along the ureter. He had had experience of this kind several times, and one quite recently in which, together with a typical ureteral colic, the patient also had anuria. The patient also had a clear case of Bright's disease and had had it for a number of years. The subsequent postmortem examination revealed that there was absolutely no formation of calculus whatever. The case illustrated the value of taking skiagraphs. The skiagram in this case showed no ureteral calculus. Recently during the course of an operation for appendicitis he came upon what felt to his finger like a calculus about the brim of the pelvis on the right side, immediately over the ureter, and upon closer examination it proved to be a calcareous deposit as large as the end of his thumb in the mesenteric ileum immediately overlying the ureter. He removed it. He could not say whether it was a calcareous degenerated gland or not. These were simply points to emphasize the care that ought to be taken in these cases.

Dr. Porter mentioned another case that occurred in his practice several months ago which illustrated several points connected with calculus in the ureter.

DR. C. C. FREDERICK, of Buffalo, said there was no question but that there were many cases of trouble in the right ureter for which the appendix in the past had been blamed and removed. He had seen quite a number of cases of this kind in one way or another in his own practice or in that of others and he had been forced during the last three or four years to a realization of the fact that pain upon the right side from pressure deep down over McBurney's point did not always mean that a patient had chronic appendicitis, and he thought in many instances the trouble was in the ureter. There were so many conditions that could exist in the intestinal tract, such as various concretions, etc., that skiagraphs might fool the surgeon with regard to the existence of a stone in the ureter. Five or six years ago he had a young woman, twenty-seven years of age, who had all the symptoms of stone in the kidney, with pain, and blood in the urine, and the like. She had had these symptoms for two or three weeks. She kept on having attacks of pain. He had a skiagraph taken which showed that there was undoubtedly a stone in the ureter, only a short distance below the pelvis of the kidney. He opened from behind and went clear down to the brim of the pelvis, but the stone was not there. He opened the pelvis of the kidney, explored it, and could not find the stone. Then he explored still further and even went clear down to the bladder without finding any stone. Patient had not passed a stone. There was a concretion in the woman's intestinal tract on the left side. It was not the appendix and he was led astray. She had since had three or four similar attacks. He had had skiagraphs taken, but had been unable to find any evidences of stone. He did not know what the cause of it was, but he knew she had these attacks and he operated on her without finding anything. He gave this experience for what it was worth.

This was a very important subject and there was no doubt that the lower abdomen, particularly upon the right side, must be subjected to a very careful differential diagnosis in cases of indistinct pain in that region.

Dr. Maurice I. Rosenthal, of Fort Wayne, Indiana, stated that he had read a paper before a district society some four or five years ago, in which he reported a case of stone in the ureter which complicated an appendicitis. This was the only case he had then seen of ureteral stone complicating appendicitis. Since then he had been careful to investigate the right ureter in operations for appendicitis, and he had not met with another such case. This complication was not frequent, although it did occur.

He had not had so much experience in cases of obstruction from stone in the ureter, but he had had considerable experience in ureteral surgery. In the course of a radical operation for cancer of the uterus, as advised by Wertheim, one had occasion to handle the ureter considerably, and he drew attention to this important point—namely, the danger of ureteral fistula was less likely to be due to a simple incision in the ureter and the consequent opening of the ureter with the escape of urine from this cause than it was to the handling of the ureter itself. Lifting the ureter from its bed interfered with its circulation and was very likely to be followed by ureteral fistula, so that in the extraction of stones we should be more careful not to handle the ureter, and then we need not be afraid of getting ureteral fistula from a simple incision in the long axis of the ureter itself.

Dr. Hugo O. Pantzer, of Indianapolis, stated that in operating on a case of gangrenous cholecystitis, in which there was a discharge of the contents of the gall-bladder into the peritoneal cavity, he was led to examine lower down and found at the bifurcation of the abdominal aorta a number of stones to the feel, which were exceedingly hard and thick. We reamed out one of these stones and found it to be a calcareous degeneration of tubercular glands. It would seem from the history of the case that the woman, fifty years of age, had in early life a tuberculosis appertaining to this lower part.

Dr. John W. Keefe, of Providence, Rhode Island, referred to the use of the wax-tipped catheter. We all knew that one might be mistaken in reading a radiograph or radiographs, although a radiograph would give more information at the present time if promptly made than almost any other method if the radiograph was made while the ureteral catheter was in the ureter. Previous to the time of introducing radiography into surgery, he introduced a wax-tipped catheter and found markings on the wax. The catheter was introduced into the pelvis of the kidney, and subsequently on the day the patient was to be operated on he again passed the wax-tipped catheter to the kidney, made an incision in the loin, and found the catheter in contact with the stone in the kidney, showing that the first markings on the wax were correct. In these obscure cases this was another method of enabling us to make an accurate diagnosis.

Dr. K. I. Sanes, of Pittsburg, Pennsylvania, cited a case which illustrated the difficulty of making a differential diagnosis between not only ureteral trouble and appendicitis of the chronic form, but in the acute cases.

A young woman fell off of a train, shortly after which she developed some acute symptoms of pain in the right side, elevation of temperature, and the like. A diagnosis of typhoid fever was made, and she was treated for some time in the hospital for that disease, then discharged as cured. She went home, began to work, but soon developed another attack, which was diagnosticated as recurrent typhoid fever. She was sent back to the hospital, inasmuch as she had a temperature which lasted two or three days. This subsided, and the patient was sent home. While at home she developed a severe attack of pain in the right side, the family physician was called in and diagnosticated a tumor on the right side in the region of the kidney. She was then sent to the hospital, he saw her there, but a tumor was not found. The patient was turned over to the medical department, and while there developed an attack simulating acute appendicitis. She had severe pain in the right side, tenderness, vomiting, and temperature. In view of the fact that this attack came on just prior to menstruation, he examined the pelvic organs and found the right ureter thick, cord-like, and very tender to the touch. He made a cystoscopic examination, passed the catheter on that side, and got urine with many blood cells and quite a number of leukocytes. Unfortunately no bacteriological examination was made. He diagnosticated ureteritis. Having obtained a history of pain in the right side and of a fall, he excluded appendicitis by the absence of rigidity on that side, by the fact that the pain could be traced alongside the ureter, and McBurney's point was not tender. But in spite of these findings, the symptoms were so clear of appendicitis that the general surgeon thought it advisable to operate. Accordingly, the appendix was taken out, and the report of the pathologist was negative. While recovering from the appendicial operation she developed severe pain on the other side, with a rise of temperature. He again made a cystoscopic examination and found trigonitis, found the ureteral orifice on the left side inflamed, passed a catheter into the left ureter, and found the same condition there. This was four or five years ago, and at present this young woman was again in the hospital. An operation may be necessary on the kidney for tubercular pyelitis on both sides, the right side being in a very bad condition.

The reason why he reported this case was to emphasize the point that there was not only difficulty encountered in making a diagnosis in chronic cases, but in the acute cases. Not only stone in the ureter, but tubercular pyelitis and descending ureteritis would give symptoms simulating appendicitis to such an extent that, in spite of the finding of the ureteral trouble at the time, the general surgeon in this case was so sure of appendicitis that he deemed it necessary to remove the appendix.

Dr. Jonas, in closing the discussion, pointed out that a shadow demonstrated by the X-ray in the region of the ureter did not prove that the shadow was produced by a stone. A concretion in the neighborhood of the ureter, a fecal concretion in the tip of the appendix, might produce a shadow in the ureter, and for that reason the X-ray examination, cystoscopic examination and ureteral catheterization should be combined; not only this, but the surgeon should so arrange the ureteral catheter that it will throw a shadow on the skiagraphic plate.

THE SURGICAL TREATMENT OF TUMORS OF THE BLADDER.[1]

BY

JOHN W. KEEFE, M. D., LL. D.,

Providence, R. I.

It is estimated that from one-fourth to one-half of 1 per cent. of all tumors involve the bladder. Tumors of the bladder are most frequently met with in men over thirty years of age, and are more often found in males than females. Any portion of this organ may be affected, but the lower half of the bladder is the usual situation of new growths.

We find a large variety of tumors affecting the bladder—namely, papilloma, carcinoma, adenoma, cysts, fibroma, myxoma, sarcoma, myoma, chondroma and dermoid. From 65 to 75 per cent. of tumors are malignant. It is believed that benign growths may become malignant and that malignant bladder tumors remain localized for a comparatively long period; hence, we may look for good results by an early and thorough removal of the neoplasm.

Papillomata originate in the mucous membrane and submucous tissue. They are usually pedunculated but rarely may be sessile. They consist of long fimbriated processes or villi. They have a tendency to recur after removal and may propagate by contact. Mucous polypi are found during childhood.

Carcinoma occurs late in life; while sarcoma may appear during childhood but usually develops after middle life. Fifty-two per cent. were over forty years of age and 28 per cent. under ten years of age, in a series of fifty cases reported. Albarran reports one hundred and thirty-two cases of tumors of the bladder; one hundred of these were cancerous and twenty-four papillomatous. Carcinoma forms a nodular, ulcerated and irregular growth. It invades the muscular wall but may involve any portion of the bladder.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1900.

Urinary salts may be deposited upon the raw areas and these may break off and be found in the urine. This may lead one to suspect the presence of a calculus. Adenomata are flat or nodular in appearance and may attain a large size. Fibroma, myoma, myxoma and cysts rarely cause hemorrhage but may produce pressure symptoms. Chondroma and dermoid tumors are very rare.

The most constant symptom of papillomatous growths is hematuria. The bleeding is usually bright and terminal and occurs at irregular intervals. The hemorrhage may not recur for months or even years. The amount of blood lost varies and is not dependent upon the size of the growth. Clots may form in the bladder and cause pain, frequency of micturition and retention of urine. Cystitis, hydronephrosis and pyelonephritis may be sequelæ. We often find the patient in an anemic condition from the excessive loss of blood. Sepsis and uremia due to an ascending infection may result.

Malignant disease is accompanied by bladder disturbances, frequent and painful micturition, tingling and itching sensations in the glans penis, severe cystitis, sensations of weight in the pelvis and pains extending along the inner portions of the thighs. Hematuria which is prone to be slight, persistent and painful is found in the later stages of the disease. Hydronephrosis, pyonephrosis and pyelonephritis are frequent complications.

A cystoscopic examination of the bladder should be resorted to early, as it is the greatest aid that we possess, to the formation of a correct diagnosis in bladder diseases. The early detection of a growth may be our only hope for saving life. Rectal, vaginal and bimanual examination may reveal a bladder tumor or infiltration of the bladder wall and should be practised. These examinations may also be made while viewing the interior of the bladder with the cystoscope. Malignant disease of the base of the bladder may be mistaken for hypertrophy of the prostate.

The surgery of tumors of the urinary bladder is in a transitional state. The last word has not been said. While the perineal and vaginal routes have been abandoned by most surgeons, some now prefer the urethral, while others the suprapubic extraperitoneal and yet others the abdominal intraperitoneal route or a combination of both. The medical treatment of vesical growths is often prolonged until surgery is of no avail.

It is important to locate the growth with the cystoscope and to make one incision in the bladder for its removal, when possible, rather than a routine median incision. The exact location and type of the growth should determine the choice of operation. Comparatively few men have become expert with the operative cystoscope and these prefer to remove all benign growths by the endovesical method. Nitze reported 150 cases of papillomata of the bladder removed with the aid of the operative cystoscope, with three failures, one death and ten recurrences. It may require a number of sittings to remove a large growth by this method but it certainly is of value in the hands of an expert.

The suprapubic operation, working in the prevesical space, is the method most frequently employed at the present time; although the abdominal intraperitoneal route has many points in its favor. It gives one plenty of room in which to operate and one can see exactly where to excise or cauterize the growth.

The cystoscope is an instrument with which we all should become more familiar. It gives us accurate knowledge of many kidney and bladder conditions that cannot be acquired in any other way. A surgeon who undertakes the removal of a bladder tumor can perform his work more intelligently, if he has viewed the growth through a cystoscope and gained an idea as to its character, location and size. Recently a certain writer in genitourinary surgery stated that he did not think it an instrument of value to the general practitioner or the general surgeon. If the general surgeon is the man who is to remove the tumor, why should he not use and know how to to use, the cystoscope, if it be of value to him and his patient?

One should become familiar with both direct and indirect view instruments and with the appearance of the bladder when distended with either water or air. I have had two cases where specialists, in genitourinary work, failed to find a tumor of the bladder owing to the presence of blood which obscured the view through the water which was used to distend the bladder. The use of a cystoscope with air distention revealed the growths in both instances. One should not become wedded to one type of instrument: they all have their good points. The brilliant work that has been accomplished with the Nitze, Casper and Albarran cystoscopes has led some men to overlook those instruments that allow distention of the bladder with air.

The cystoscope will give one a better view than is often obtainable through a suprapubic incision. How difficult it is to see the interior of a contracted bladder, especially in obese patients, through the usual suprapubic incision in the prevesical space; and how easily one can reach the bladder through the abdominal wound made in operating for disease located in the pelvis. Then why not open the abdomen in most of the cases where we wish to operate for the removal of bladder tumors?

The choice of the anesthetic is an important matter for consideration in the removal of bladder tumors; as the patients are often found in a debilitated condition from the loss of blood, sepsis or diseased kidneys. Nitrous oxide gas and oxygen is preferable on account of its safety and its nonirritating effect upon the kidneys. It permits a speedy recovery from the anesthetization and early voluntary micturition.

I particularly wish to call attention to the steps of an operation for the removal of tumors of the bladder which I believe has many points in its favor. I shall describe the method which I first employed, some five years ago, in operating for the removal of a papillomatous growth of the bladder in a man sixty-six years of age. He complained of frequent micturition, pain and intermittent hematuria for a period of three years and had lost forty pounds in weight during the last two years.

An internal urethrotomy was done to relieve a stricture due to a gonorrhea contracted in early life. A cystoscope was then introduced and a papillomatous tumor could be seen posterior to and about 1 cm. from the left ureteral opening. The ureters were catheterized and the urine from both kidneys was found normal. A week later the patient was anesthetized, the cystoscope introduced and the left ureter catheterized. The ureteral catheter was allowed to remain during the operation, which permitted the removal of a portion of normal bladder wall about the growth, with no danger of wounding the ureter: as I could determine by palpation of the catheter in the ureter, at any stage of the subsequent operation, the exact location of the ureter. It is a great source of comfort to the operator, as well as safety to the patient, to be able to define the position of the ureter, when one is operating in a field adjacent to it. The cystoscope was allowed to remain in the bladder.

The patient was then placed in the Trendelenburg position and the abdominal cavity opened, in the median line, between the umbilicus and the pubes. The intestine was walled off, with a roll of sheet rubber, seven inches by fifteen feet and of the thickness of the rubber dam that dentists use. Gauze sponges protected the edges of the wound. An assistant looking at the growth through the cystoscope, directing the beak of the instrument against the wall of the bladder at the site of the tumor. The transmitted light from the cystoscope could be seen and the beak of the instrument felt through the bladder wall, thus defining the position of the tumor as seen through the abdominal opening.

With one hand I made counterpressure on the peritoneal side of the bladder and beginning in the prevesical space, separated the peritoneum from the bladder, down to the site of the tumor. The bladder wall over the center of the tumor and including the greater portion of the growth was then grasped with a volsellum forceps. The median incision in the peritoneum was now closed with a continuous catgut suture, thus permitting the subsequent operative procedures to be carried out extraperitoneally.

The tumor with a wide margin of normal bladder was excised with a knife and the opening in the bladder was closed with two rows of sutures, the first row a continuous Connell mattress suture of catgut, including the mucous and muscular walls; and the second row a continuous Cushing suture of Pagenstecher linen, in the muscular coat. The abdominal wound was closed in layers, chromic gut in the fascia, with a bite in the muscular wall of the bladder, to narrow the prevesical space, plain gut in the areolar tissue and a subcuticular silver wire in the skin. A small rubber tissue drain was placed in the lower angle of the wound, down to the sutures in the bladder. This drain was removed in forty-eight hours. Primary union took place. After the operation the patient may be allowed to pass water at frequent intervals or he may be catheterized.

During the removal of the growth by this method, one avoids the risk of infecting the peritoneum with the septic contents of the bladder, as a cystitis is usually present. Should leakage occur through the bladder wound, the small drain will guide the secretions to the surface, rather than allow them to enter the abdominal cavity and produce a peritonitis, which might prove fatal.

The operation may be rapidly performed and takes much less time than it does to describe it.

To sum up:

1. Anesthesia with nitrous oxide gas and oxygen.
2. Cystoscopic examination, to determine the site and character of the tumor.
3. Ureteral catheterization. The catheter is left in the ureter as a guide during the operation.
4. The high Trendelenburg position.
5. Opening the abdominal cavity, to accurately locate the growth, to aid in separating the peritoneum from the bladder over the site of the tumor and, also, to allow plenty of space in which to operate.
6. An assistant locates the growth in the bladder with a cystoscope during the operation.
7. Closure of the peritoneal cavity, the growth having been removed through an extraperitoneal wound.
8. Immediate suture of the bladder.
9. The patient voids urine or is catheterized at frequent intervals.

259 BENEFIT STREET.

DISCUSSION.

DR. C. C. FREDERICK, of Buffalo, said he had operated upon three cases of carcinoma of the bladder, the last one about three months ago. The first occurred some six or seven years ago, in a woman and the tumor was located in the posterior wall of the bladder just back of the trigone. Cystoscopic examination showed an eroded, ulcerating carcinoma about the size of one's thumb-nail, with a crater-like formation around it, and elevated. The tumor could be easily mapped out by bimanual palpation through the vagina and it lay just anterior to the uterovesical fold in the vagina. This woman was quite anemic. She had been bleeding more or less for a considerable time. He determined in this case to operate through the vagina. He went at it the same as one would do a vaginal hysterectomy, opened into the fornix, stripped up the vaginal mucous membrane, peeled it off, separated the bladder wall, incised the tumor, and then closed the incision, without closing the bladder wall, with two rows of sutures, and brought the vaginal wall upon the cervix without draining. The woman made a good recovery. She went along for a period of two or three years, and he supposed she was going to get well, but eventually she had a metastasis to the left side of the original scar. She did not undergo a secondary operation, and eventually died of anemia.

In a second operation he did a total extirpation of the bladder with the uterus, the tumor having occurred at about the junction of the bladder and uterus and involved the anterior wall of the uterus. He went down in that case intraperitoneally, removed the uterus and bladder *in toto*, turning the ureters into the vagina, leaving the urethra, hoping eventually to do an operation which he had seen Pawlick perform of making an artificial bladder out of the vagina. The woman went along for a period of two months, but eventually died from infection which traveled up the ureters into the kidneys. Dr. Frederick then related a third case upon which he had operated.

Dr. Ernst Jonas, of St. Louis, pointed out that with the cystoscope we were usually able to settle definitely the size of the tumor, but he thought it advisable not to be too sure in regard to the character of the growth. He mentioned a case in which for a long time there was profuse hemorrhage from the bladder. He was unable to determine that there was a tumor of the bladder, and much less that it was malignant. He so told the patient, and the patient went to an expert in cystoscopy in this country, who assured him that he had a cancerous growth of the bladder. The patient went abroad and consulted one of the best authorities there who told him the same thing. The patient returned to this country, operation was proposed to him, but he had been told that his chances for recovery were so bad that he made up his mind not to be operated on. This patient had been comparatively well for four years after the cystoscopic examination, with the exception that from time to time he had small hemorrhages from the bladder.

Dr. Maurice I. Rosenthal, of Fort Wayne, mentioned a case in which he performed a radical operation for cancer of the uterus which involved the bladder. In this case he removed a piece of the bladder. The woman was fifty-eight years of age, the operation having been done some four years ago. She came to the hospital with a large fixed uterus, and examination revealed that it was necessary to resort to immediate tamponade to control hemorrhage. The softened cervix was rapidly curetted cauterized thoroughly, and her abdomen opened. The bladder had failed to give way from the uterus as usual, so that he removed two lobes of the upper half or more of the vagina, together with a piece of the bladder about as large as a silver dollar. It was necessary to excise a portion of the ureter, and he immediately implanted the ureter, after having closed the bladder. He illustrated the method of implanting the ureter on the blackboard.

Dr. Keefe, in closing the discussion, said he would like to have heard an expression of opinion from the members with reference to this method of removal of tumors from the bladder.

OPERATIVE ENLARGEMENT OF THE PELVIS OF THE NONPREGNANT WOMAN.[1]

BY
JOHN N. BELL, M. D.,
Detroit, Mich.

(With one illustration.)

THE operation of pubiotomy as a means of effecting delivery in moderately contracted pelves, where a trial at labor has taken place and efforts to deliver with the forceps have failed, is now an established operation, and is rapidly coming to the front as the proper procedure in such cases. The dangers incident to the operation, however, are by no means insignificant, and this fact led the writer to inquire into the methods at our disposal to obviate them.

To that end it was thought that the pelvis might be enlarged by operating in the nonpregnant state, and thus prepare the woman for future delivery. This thought at first seemed untenable, but we all know that in years past operations on the pregnant and parturient woman were only done in the most urgent cases, whereas nowadays it is considered little short of criminal to allow such extreme indications to arise before surgical measures are adopted.

The writer does not wish to be placed in the position of advocating this procedure in preference to premature delivery at the eighth month, or primary Cesarean section at term, but rather in order to bring the subject squarely before the Association for discussion, would assume that the operation is a justifiable one, and to that end presents arguments tending to such a conclusion. What, then, are the dangers and disadvantage of the operation at term?

First.—Hemorrhage, owing to the turgid condition of the pelvic vessels in the pregnant state. This danger is entirely eliminated when operating in the nonpregnant state.

Second.—Sepsis. When operating in the nonpregnant state more care can be exercised in securing a cleaner field for the operation, and the well-known susceptibility to infection in the puerperal state is avoided.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Third.—Injury to the vaginal attachments and bladder due to passage of the child's head against the severed ends of the bone, and undue separation of the divided ends, are all avoided when the operation is done in the nonpregnant state.

Fourth.—The difficulties of handling the patient after the operation at term are materially lessened.

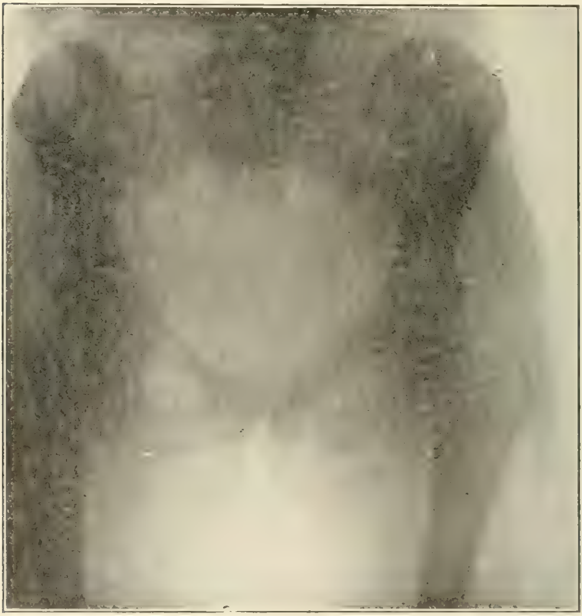

FIG. 1.—Operative enlargement of the pelvis of the nonpregnant woman.

Indications for the Operation.—The indications for the operation are: a history of two or more difficult deliveries with child born dead, further attempts to secure a living child by premature delivery, a true conjugate of 7 1/2 to 8 1/2 cm., a dread of Cesarean section, and a strong desire on the part of the patient to give birth to a living child. It is granted that only a comparatively small increase in the pelvic diameters can be secured when operating in the nonpregnant state yet, in a properly selected case, the increase is just sufficient to convert an otherwise dangerously contracted pelvis into a comparatively normal one for future childbearing.

Fry has shown that small children are generally born to small mothers, yet this is not always the case, for it has been the experience of many of us that large children are frequently born to small mothers whose husbands are large men. This fact should also be taken into consideration when summing up the indications for doing this operation. The case which I wish to report is as follows:

Mrs. R., aged twenty-seven, has never been pregnant but is very desirous, as is also her husband and mother, that she give birth to a living child. On examination, I found a uterus of normal size and anteflexed. She gave a history of dysmenorrhea, but otherwise the genital functions, except for the apparent sterility, were normal. Thinking the condition might be remedied by curettage, divulsion and the wearing of an intrauterine stem pessary, I advised this treatment. Noting also that the pelvis was small, I made pelvimetric measurements and found the following diameters:

External conjugate	17 cm.
Interspinous	19 cm.
Intercristal	21 cm.

I explained to the patient and her mother the difficulties which she would be likely to encounter, should she be obliged to give birth to a child through such a small pelvis, and suggested that, while she was under the anesthetic for the curettage, I could saw through the bone and enlarge the pelvis at the same time. They both readily consented, and I operated at Harper Hospital May 23, 1908, during clinic week.

In doing the operation I followed the method of Döderlein in his operation of pubiotomy at term, and spread the severed ends of the bone 1 1/2 cm., holding them apart with a small steel retractor which was left *in situ* for ten days. There was very little hemorrhage. Healing was slow; the wound became infected and convalescence was further complicated by a vulvovaginal abscess which developed about the twelfth day after the operation, the discharge from which yielded the gonococcus. She then acknowledged having had a similar swelling of the left labium several months before she entered the hospital.

She also developed a typical attack of scarlet fever, which ran the usual course, followed by desquamation. She has completely recovered, however, and walks without any discomfort. The pelvic measurements now are:

External conjugate,	17 cm.
Interspinous,	20 cm.
Intercristal,	22 cm.

This shows an increase of 1 cm. in the transverse diameters. It is fair to presume that the flaring out of the left side of the pelvic ring would give greater space on that side for engagement of the head at the superior strait.

The author is free to confess that the indications for the operation in this case were only relative, as the woman had never been subject to a trial at labor, and the operation in this case was only attempted after a thorough understanding with the patient, her husband and mother. The skiagraph, taken six weeks after the operation, shows a light line of only about 1/3 cm. in width at the point of separation of the bone, while the pelvimetric measurement of the transverse diameters shows an increase of a full cm. This is accounted for by the fact that the bone was sawed through in an oblique direction from the median line outward, and the ray of light consequently shows only through the newly formed bone between the apices of the severed ends.

This proves conclusively that a distinct enlargement of the pelvis can be obtained by operating in the nonpregnant state and preparing the woman for future childbirth. The question of the advisability of this procedure remains to be determined.

418 FOURTH AVENUE.

DISCUSSION.

DR. E. GUSTAV ZINKE, of Cincinnati, Ohio, said that this was evidently an entirely new departure in the practice of obstetrics. He had always hailed with delight anything new which would give relief to the trials of labor. He could not see what was to be gained by attempting to enlarge the pelvic ring in the nonpregnant state in the hope of facilitating labor at the end of term. The skiagraph presented by the author showed very little space gained in the line of separation of the bone by the pubiotomy that was performed. The amount of room gained (one centimeter) in the external measurements would indicate that some room had been gained in the diameters of the bony ring of the pelvis, but not enough in his opinion to give birth to a full-term child.

Personally, he was opposed to this procedure, although he was not speaking from personal experience. He was only discussing the question theoretically and from what he had learned after listening to the paper, he had received no encouragement to adopt the procedure recommended.

DR. ALBERT GOLDSPOHN, of Chicago, agreed with Dr. Zinke in regard to the indications for pubiotomy. As to the technic of performing such an operation, if he regarded it as proper, he thought he would saw the pubic bone very much on the slant, so that it could be separated, and yet keep parts of the bone in contact, even though it could be fastened with wire, having closed the wound, and not predisposing the woman to infection by having a foreign body between the severed ends of the bone. By cutting or sawing the pubic bone markedly on a slant, one could separate it and keep certain relations together.

The chief objection to this procedure was that when such a separation in the pelvic ring was made at the time of childbirth, a very much greater separation of this bone occurred during the transit of the child, a separation of two inches occurring in extreme cases, that is, the gap adapted itself to a very much greater accommodation by the needs of the case than was possible if one simply secured a couple of centimeters greater distance in a fixed bony pelvis.

DR. RALPH WALDO LOBENSTINE, of New York, could not see any possible advantage in doing this operation in such a case, with all due respect to the author. He thought if the woman had been subjected to the test of labor the dilatation would be sufficient to allow the baby to go through without such an operation. In this particular type of justo-minor pelvis, it was surprising to witness the results that occurred without any operation. Where there was an external conjugate of seventeen centimeters, and the other measurements corresponded, in a justo-minor pelvis there was a tremendous flexion of the child's head whether one had to deal with anterior or posterior position, and this flexion was sufficient to permit the head of the child to be driven through such a pelvis.

DR. BELL, in closing the discussion, said he did not want to take the position of advocating this procedure. However, he thought this particular case was favorable for this operation. All felt safe in operating on these patients in a well equipped hospital, where the women would be properly cared for, and everything as clean as possible. In view of the fact that he got the consent of the mother and patient, he thought he was justified under the circumstances in resorting to pubiotomy.

CHYLOUS CYST OF THE ILIAC MESENTERY.

BY
CHARLES E. CONGDON, M. D.,
Buffalo, N. Y.

THE patient is a boy five years and eleven months old at the time of operation, born of an Italian father and a German mother, the latter having been born in the United States. Both parents are young, healthy and with an entirely negative family and personal history. The mother was unusually well during pregnancy and both labor and puerperium were normal. The child was breast fed. In spite of these favorable conditions, he was cross, suffering from so-called stomach cramps, for which a physician was consulted when the child was three months old. At this time, the diagnosis of bubonocele was made and a starch bandage was applied but it was removed after three days and the improvement in symptoms which ensued can scarcely be attributed to it. Indeed, the entire absence of any sign of an open ring at present casts doubt on the diagnosis, although it is conceded that spontaneous closure is of frequent occurrence.

Following this procedure, the child was quite well for about two years when, at the age of about two and a half years, he fell down five or six steps and, although there was no apparent traumatism, he began, after a few days, to suffer with pains referred to the abdomen and running down the left leg. The pains gradually increased in severity, though continuing intermittently, and the abdomen, always large, became more protuberant. At different times, different physicians treated the child under various diagnoses, such as trichinosis, stone in the bladder, kidney trouble, colic, and the like, but without much amelioration of the symptoms.

Dr. Hugh S. Townsend was called August 6, 1909, on account of pain in the stomach, which was relieved by castor oil. August 14, at 6 A. M. he was again called on account of a recurrence of the pain, with vomiting, ascribed to eating green apples the day before. He gave calomel followed by salts. At 1 P. M., on account of increased pain, continued vomiting, increasing abdominal distention and failure of the cathartic, he gave an

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

enema. This was repeated during the afternoon without success. While the abdomen was too sensitive for careful palpation, both the swelling and the tenderness were more marked over the region of the appendix and, though the temperature was normal, the pulse had become extremely rapid, therefore, with the evident intestinal obstruction present, it was decided that an operation was necessary. Accordingly, morphine was given to relieve the pain sufficiently to remove the child to the City Hospital.

I operated at 10 P. M., making the usual incision for appendix operations. On opening the abdomen, a tense cystic tumor presented. The tumor resembled an ovarian cyst but was more elastic and it had the color of omentum. On enlarging the abdominal incision, the tumor was found to be the distended iliac mesentery beginning about eighteen inches above the ileoceceal valve. It was ovoid, with a valley lodging the bowel, and dwindling toward the posterior mesenteric attachment into a wedge-shaped separation of the mesenteric layers. The ileum corresponding to the mesenteric cyst was compressed into a white cord while, above, it was distended. After incising the cyst, about two quarts of milky fluid gradually drained away, the reduction of tension, allowing the vessels of the bowel to fill and the pallor to disappear, while the relief of pressure caused the lumen of the bowel to become patulous and the distention above passed away.

The cyst was sutured to the abdominal incision and was drained by a rubber tube held in place by a stitch. Otherwise, the abdominal incision was closed by through-and-through sutures of silkworm-gut. The relief was almost immediate, the vomiting ceased and the patient slept well all night. On the following day, two soap and turpentine enemas were given, returning clear except for small particles of fecal matter, no gas being passed with the injections. On the second day, the patient complained of severe abdominal pain, especially when urinating. Calomel followed by magnesium sulphate was given and, during the third day after the operation, the bowels moved twice, the stools being light brown and mainly liquid with some hard particles. The maximum temperature was 101.2° F. in the night following operation, falling to normal within two days. The pulse for the first two days of hospital treatment ranged between 100 and 120, thereafter between 80 and 90.

Two days after operation, August 16, the blood showed a moderate lymphocytosis, the physical examination, so far as it could be made at this time, being negative. The fluid, examined by Dr. Benedict with the assistance of Herbert M. Hill, Ph. D. chemist, showed the characteristics of chylous effusions but with the absence of sugar in each of the two samples furnished.

The tube was removed August 26. The dressing was changed again August 29, the wound draining freely but slightly. Beginning September 4, there was a recrudescence of pain and vomiting and the temperature varied between 98.4 and 100.2. Palpation revealed a reaccumulation of fluid though not nearly as great as at first. Accordingly, on September 8, the drainage wound was reopened by means of a grooved director and canula and nearly a pint of milky fluid was removed. Following this, the patient became more comfortable and left the hospital September 14, 1909.

L. Napoleon Boston, in the *Journal of the American Medical Association*, vol. xliv, 1905, reviews the literature of chylous effusions, collecting 126 cases and adding two original ones. All of these were ascitic except four which were cystic. All four were in infants of five months or less, all were drained, all recovered, and all were considered congenital. I have been unable, thus far, to find records of true chylous cysts in the adult or even at an age equal to that of the present case. The parents state that this child has always had a large belly and the history corroborates the idea that the cyst was congenital. I have also been unable to find any definite observations as to etiology of the obstruction of the lymphatic current which is obviously the direct cause of the formation of a cyst or of a peritoneal effusion. An anomaly of development is the probable explanation, so far as it can be considered an explanation, in cases discovered early in life, while in adult cases of chylous ascites, cancer, tuberculosis and various other lesions are present. The boy has always been well nourished, indicating that there could not have been a complete obstruction of the thoracic duct, while the very limitation of the cyst to one part of the ileum would indicate that only part of the mesenteric lacteals are involved. Clinical cases of interruption of the thoracic duct in the neck, where the absence of effusion into the great serous cavities excludes indirect factors of depression as well as experimental section and ligation of the thoracic duct, have led to rather rapid inanition.

THE MARKEEN.

DISCUSSION.

Dr. Miles F. Porter, of Fort Wayne, reported the case of a young man, fifteen years of age, who gave a history of having had a number of attacks of what were pronounced intestinal colic, but when he saw him at night there was a clear clinical history of obstruction of the bowels, with well advanced peritonitis. Upon opening the abdomen, he found that he had to deal, first of all, with volvulus, but in unraveling this volvulus it was found to be due to what proved to be chylous cysts of the mesentery, these cysts varying in size from the end of his finger to the size of a large walnut. These evidently had been the cause of the volvulus. He made a resection of the gut, but patient died from the continued progress of his peritoneal infection.

Dr. Ernst Jonas, of St. Louis, said it was utterly futile to try and relieve a true obstruction of the bowels by medicines given by mouth. Such medicines aggravated the condition of the patient, they made the distention greater above the seat of obstruction and carried the infection through the intestinal wall into the free abdominal cavity, producing in this way peritonitis.

The only cases where really we could accomplish anything with medicines would be in fecal impaction, and even in these cases we should not give cathartics.

Dr. Alexander Hugh Ferguson, of Chicago, stated that he had never encountered a case of chylous cyst of the mesentery in his surgical experience and he thought it was well in discussing a paper like this to speak of the relative infrequency of these cases.

EMBRYO ABDOMINAL SURGEONS WITH INADEQUATE PREPARATION AND KNOWLEDGE.[1]

BY

J. H. CARSTENS, M. D.,

Detroit, Mich.

When a medical student hears of a thousand dollar fee received by the surgeon for an operation requiring only ten or fifteen minutes, he makes up his mind that he will be an abdominal surgeon.

If he is, or becomes a senior and knows all about anatomy, and then attends the clinics and sees the professor do these difficult and complicated operations with great ease, in a short time he becomes still more impressed, and is convinced that he is cut out for an abdominal surgeon. He does not know anything about the trials of the work, the study, the practice on the cadaver and the lower animals which the professor has done. All he knows is what he sees immediately before his eyes, and then the story of the big fees. Hence, when he graduates, without further preparation, he goes out and operates whenever he can. His facilities are generally poor, the environment worse, and the technic beyond description. Some patients recover, some die, but he keeps right at it. It is wonderful how many diseased ovaries and inflamed appendices a young doctor finds. Every painful monthly flow indicates a diseased ovary which must be promptly removed; every bellyache is appendicitis. His diagnostic abilities have not been developed. Careful differential diagnosis he does not need to make. The professor told him, pain in a certain region is indicative of this, that, or the other, and he enters in "where angels fear to tread." That is one class of inadequately prepared abdominal surgeons.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Another class, and I think the worst, is the general practitioner who has been practising twenty or thirty years and treated very properly everything that came along, but whose surgery has been limited to fractures, dislocations and lacerated wounds of various kinds. If he is especially fortunate, he has perhaps operated for strangulated hernia. Such practitioners also hear of the wonderful fees and little work. They perhaps take patients to a medical center where the operator receives a good fee; they make up their minds that they can do the work themselves, and they would be glad to get one-half, or one-quarter the fee received by the specialist.

Away they go to a post-graduate school and take a course, and in from four to five weeks return, full-fledged specialists. They were at the celebrated U. Y. Z. Post-Graduate School, and have seen a great number of operations—through an opera-glass, a hundred feet away from the table. They have been told how easy it is—in fact, they saw, themselves, how easy it was, and they are now ready for business, and are ready to do anything, from a suppurating kidney to an obstructed pancreatic duct. They treat smallpox and diphtheria, in fact, all contagious diseases. Their instruments are few and rusty; without proper assistants or nurses, they operate in the house, where sterilization is always imperfect.

They do just like the young surgeon first mentioned—if anything, worse. As a general rule, when a number of patients have died on their hands, and their reputation is injured, they quit, and know enough to put the responsibility on somebody else.

These are the principal types of embryo surgeons we meet, and serve to illustrate the point I wish to make. If you called the attention of these men to the errors they make, they'd immediately say: "Why, you made mistakes when you started; we've got to learn just as you did." Now this is true. We did make mistakes when we developed abdominal surgery. We were blazing a new path; nothing was known, figuratively speaking, of the conditions—we had to feel our way along. But we were careful. We operated only on those cases where every other means had failed. In all our writings of twenty or twenty-five years ago, every one reiterated the need of careful diagnosis, trial of all other means before resorting to surgery. In the beginning we naturally made mistakes, but we worked carefully and cautiously, and slowly, and called attention to our errors, and learned from one another how to avoid these in the future, and gradually the path became clearer, and broader, and thus, in the course of time, we got more courage, we were more able to make a diagnosis, we could operate with less danger to the patient, and we more and more cleared up all the moot points in the diagnosis of the cases and technic of operations.

Simply because we made mistakes to show others the way, simply because we cleared the underbrush and made a road possible is not to say that every Tom, Dick and Harry should come along and make those same mistakes, because we made them. All of our mistakes are placed on record, and we have warned our successors of the pitfalls. Moreover, every one of us will always be perfectly glad to help any young man, for that matter any old man, how to do abdominal surgery or any other kind of surgery, if they will only be willing to take the time to undertake it, as we did, step by step, and little by little, mastering one point after another.

In order to become a surgeon, and especially an abdominal surgeon, it seems to me that it is absolutely necessary that the young doctor should take a special course after graduating, not by looking at operations, but by helping, and doing operations himself. He must enter a hospital, and stay there for at least two years. The first year should be devoted to the laboratory, study of internal medicine, giving of anesthetics, serving with the ambulance, and seeing, perhaps, operations, close by. The second year he should assist at the operations of a good many different surgeons, so as to learn variations of technic, and also should do operations whenever possible, under the immediate supervision and direction of the surgeons. He should operate on cadavers and the lower animals. By this means he will, in course of a year, see various kinds of surgery, divers types of surgical dexterity, and will also acquire the power of working promptly and quickly himself. Then he should be in private practice for five to ten years and do some surgery.

On another occasion I have called attention to the fact that it does not pay the general practitioner, as the instruments and equipment are expensive, and people will pay him only a very small fee, and the few cases he may have in a year will hardly make him even financially. On still another occasion I have shown that the rich specialist is not as rich as he appears to be.

On different occasions I have called attention to the necessity of specialists to investigate a particular group of diseases, to clear up the various facts of etiology, diagnosis and treatment. The general practitioner, by this knowledge furnished him by the specialists, would have his usefulness increased, his earning capacity augmented, and his standing in the community raised. Thus the specialists after solving the disputed questions, have returned into the general practice of medicine the knowledge acquired in their special field.

Although there are, in every department, special complicated difficult cases which it is necessary for the specialist alone to treat, still the general practice of medicine has profited by the specialist. This is particularly true of surgery. A great deal more surgery can be done by the general practitioners than they formerly could do, but there is a limit to this, and some surgery requires special training. It cannot be read up in a text-book or tested in the crucible. It must be based on actual experience by the attending physician.

It seems to me that in every large center, say the county seat, there should be a hospital equipped with a surgeon, or surgeons, who have been prepared for their work by a thorough course of hospital training; and it seems to me further that they should limit their practice to surgery, and not compete with their colleagues in other fields of medicine. It also seems to me that state boards should consider this question, and perhaps issue a special license to those who desire to practise special lines of surgery. In conclusion I would say:

1. Abdominal surgery by embryo surgeons should be prohibited.

2. Thorough preparation in a proper hospital, as assistant for one year, should be the minimum requirement.

3. Those who wish to practise abdominal surgery should furnish evidence of qualification.

4. Nothing contained in this paper should prevent any general practitioner from doing abdominal surgery in an emergency.

620 WOODWARD AVENUE.

DISCUSSION.

DR. ROBERT T. MORRIS, of New York City, said that this was not a question that could be settled by legislation. There was a great moral question involved in connection with this subject and it was this: who should be allowed to operate, not according to the law of the legislature, but the unwritten law recognized in the community? It seemed to him that this might be said—namely, any young man who had availed himself of opportunities of the proper sort, who began practice, might begin to do surgery, but he must bend all his energies in the direction toward surgery alone with the idea of giving up all general practice, so far as possible, as rapidly as he could and concentrate his efforts upon surgery. If a man started out with a good equipment and with the idea of gradually doing nothing but surgical work, he had a right to do surgery, although at first he might lose, say 15 per cent., of his gallstone cases. This percentage would gradually decrease to 10 or 5 per cent. as he became experienced in surgical work, so that eventually his death rate might dwindle down to 2 per cent. for gallstone cases.

The speaker did not think it right at the present time for the general practitioner to operate on a patient if competent surgical services were at hand for the reason that he (the general practitioner) could so much better devote himself to important subjects within the range of internal medicine. There was a feeling among many practitioners that they could not maintain their dignity unless they did an occasional operation, but this was a false conception of the meaning of the word dignity, and people in the community would accord the proper place to the man who devoted his time to becoming a good diagnostician.

DR. C. C. FREDERICK, of BUFFALO, had always felt that something ought to be done, if possible, to prevent so much unskilful operating. The surgeon saw the ill-results of such operative work, but he did not think it could ever be regulated by legislation. The only way we could do was to lend our influence in the direction of inculcating a higher sense of moral responsibility on the part of the men who embarked in occasional surgery. He agreed with Dr. Morris that if a man was duly qualified and had had sufficient practical experience as an assistant with a competent surgeon, he could devote himself to surgical work. He had a right to do it, although he might have a larger percentage of mortality in the earlier stages of his surgical career than the surgeon of larger experience.

Dr. H. W. Longyear, of Detroit, said in this day when we were turning out physicians by the wholesale all over the country and when so many were trying to operate without adequate preparations, he thought that such men were stimulated and encouraged in taking up surgical work by the very men who taught them. In the city of Detroit they had a very large general hospital and any physician in good standing, a man who was a regular graduate, could bring any kind of patient there and do any kind of operation he saw fit. He thought this was wrong. This was a class of practitioners which the author of the paper should have included. He, the speaker, was a member of the staff of that hospital, while the essayist was the chief of the staff, and he suggested that he (Dr. Carstens) discourage this kind of immature work as much as he could.

Dr. James Edgar Sadlier, of Poughkeepsie, New York, said there was one point that appealed to him and it was this: if the everyday operator would report sometimes his cases more fully than he did, he would not inculcate the idea that operations were quite as easy as they really seemed. He had in mind an operator of large experience who some time ago reported over 100 consecutive prostatectomies that he had made without a death. Those who were familiar with the former work of this surgeon knew that he could not have done this number of operations of this character without a death. A point he wished to make was that the experienced operator was doing harm in reporting a magnificent series of successful results, without giving the other side of the picture.

Dr. Alexander Hugh Ferguson, of Chicago, said he had given a good deal of attention to the embryo surgeon. Every live surgeon to-day was at one time an embryonic surgeon. The former methods of dealing with them were past. The present methods were inefficient. It was for those who did surgery to outline a proper method of developing these embryonic surgeons to be equal to the occasion that happened to arise. Let the public know who the surgeon was and who the physician was, and who the general practitioner was. How were we to accomplish this? According to the standard of education and license. How were we to deal with the embryo surgeon? We must teach him by examinations and by practice and show to the public what he had done and that he was endorsed by the best men in the country; that he had had the facilities to be reckoned as a first-class surgeon and this was the one way to develop them. The embryonic surgeon must be educated. Every practitioner ought to be allowed the privilege of entering any hospital with any patient that he had a license to treat and then it was up to the men who were controlling these hospitals to see to it and guard the reputation of the hospital by precept and example.

Dr. Albert Goldspohn, of Chicago, thought a law would do some good. If the law, created by a higher authority than the individual, stated that so and so should be the standard it certainly would be good, but it could not govern and control every individual case. This whole matter brought to his mind what he had felt very keenly, which was a mistake in the choice of a specialty. The teachers of medicine in the various medical schools permitted their pupils even before they graduated, or perhaps before they were half through with their course, to look around like merchants and see what paid the best, what made the least labor and which the most convenient line of practice, and such graduates selected their specialty from such motives. Their teachers should teach them that they had no eyes and had no right to see in making such a choice. The business of these teachers was to educate them to become practitioners, to learn in a direct way every affection or disorder that existed and not learn it simply from books, and they should have enough of general practice to get a practical familiarity with the whole domain of medicine. After a considerable general practice one would find in what particular branch of medicine he was likely to succeed best, and then he could concentrate all his energies and thought in that particular channel.

Dr. E. Gustav Zinke, of Cincinnati, said that after ten years' general practice he had the hardihood to venture upon the field of obstetrics and gynecology as a specialty. He thought the fault lay in our system. The same difficulty was encountered in every other branch of industry. When he was a boy and began to recognize things he saw that the man who became a shoemaker had to work at it a certain number of years as an apprentice and perform certain work to make himself a journeyman, and then after he had worked years he had to perform a special task to become a master of his art. And so it was with the carpenter, with the tailor, with the butcher. The privilege of killing an ox was not given to everybody and anybody. Men who killed animals had to show their skill and they got this skill from the masters whom they served.

WHEN SHALL WE OPERATE FOR RUPTURED ECTOPIC GESTATION?[1]

BY
RALEIGH R. HUGGINS, M. D.,
Pittsburg, Pa.

THE habit of the writer has always been to delay operation for a few hours in ruptured tubal pregnancy when all signs pointed toward a temporary cessation of the hemorrhage. In the meantime preparation is made for operation. Morphia is administered to quiet the patient and gentle stimulation begun. If the surroundings prohibit operation at the home of the patient, she is removed to the hospital with the greatest possible care in transportation. If improvement continues there is no great hurry; but operation has usually been done, not later than twelve to eighteen hours after the onset of serious symptoms. In this class of cases recurrence of the hemorrhage has not been noted in this length of time.

During operation salines and diffusable stimulants are given intravenously and under the skin. The severe hemorrhage and the morphia previously administered, so relax the patient that little ether is necessary, and its administration for a few minutes only makes it an additional stimulant of great value. The condition of the patient under this treatment is better when leaving the operating room than before, and the mortality in this class of cases has been nil. There can be no doubt that in the vast majority of instances the hemorrhage has ceased temporarily when the consultant is called. The length of time which has transpired since the hemorrhage began varies. The more serious the symptoms, the sooner the consultant is likely to be called. The attending physician will usually say that when he first saw the patient she was in a state of collapse, but that now, which is several hours later, there is some improvement. The pulse is slightly better and the air hunger has disappeared. A pulse which was hardly perceptible when he first saw the patient is now easily counted and is of better volume. Reaction has already begun. The formation of a clot in the pelvis has plugged the bleeding point and the force of the blood stream is now so low that for a time at least, there is little danger of recurring hemorrhage.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Who can say, and by what means, are we to determine, how long this period of apparent rescue from death by nature's efforts may continue? Doubtless in many cases hemorrhage does not recur, but the experience of the writer in the study of his own cases and many that are reported in literature convince him that some further advance must be made in diagnostic skill before it can be said that hemorrhage, severe, and even fatal, may not recur in a given case. The report of two cases where operation was postponed is the excuse for a paper upon this subject at the present time.

CASE I.—This patient was not seen for twelve hours after the onset of symptoms which, judging from the history and condition of the patient, had been most grave in character, and she was still in a critical condition; pulse rate of 160 to 170; hemoglobin, 30. The surroundings absolutely prohibited operation in her home and the only hope of recovery lay in a change of environment. She was removed to the hospital without apparent harm. Thinking this was a case "par excellence" for delay in operation, if it were a safe procedure, this patient was kept under constant personal observation for the next eighteen hours. During this time there was a gradual improvement and under gentle stimulation the pulse rate had improved to 130. The patient was not allowed to stir, and was kept absolutely quiet in every way. At the end of this time, when reaction seemed to be progressing nicely, all the symptoms of recurring hemorrhage ensued. The pulse became almost imperceptible, there was great restlessness and the patient gasped for air. She was at once taken to the operating room. The pelvis and abdomen were filled with clots and fluid from the first hemorrhage and fresh blood oozed from a cavity in the tube which had ruptured, one inch from the uterus. This patient made a good recovery.

CASE II.—A short time later a patient was brought into the hospital who had taken suddenly sick eighteen hours before. Careful study of the history and symptoms present, when admitted, made a diagnosis of ruptured tubal pregnancy certain. While the hemoglobin was quite low, 38, the pulse was found good, 120. It was evident that there had been a great improvement in her condition and that reaction had been very satisfactory indeed. The operation could have been performed at this time with comparative safety. The desire to wait for further improvement having a firm hold on me I decided to postpone operation until resistance might be greater. The patient was placed in "cold storage" and morphia given to promote sleep and quiet. The next morning there was further improvement. In the afternoon, just forty-eight hours after the primary hemorrhage, she became suddenly worse with all the signs of recurring hemorrhage, and although immediately summoned, when I reached the hospital the patient was in *articulo mortis* and died before operation could be performed. Thus was lost a mother and is the only death in a series of forty cases of ectopic gestation, the majority of whom were operated upon in conditions when the risk was greater than it would have been in this woman when she was admitted to the hospital.

This experience teaches that in some cases at least when the increased blood pressure incident to reaction occurs hemorrhage may again ensue. The further delay in operating upon these patients was induced by a paper read by Dr. Hunter Robb. A series of experiments upon dogs led him to conclude that death seldom occurs from hemorrhage accompanying the rupture of an ectopic gestation, and that many deaths which follow operation might be avoided if a longer time elapsed after primary hemorrhage before operative measures were undertaken. He accordingly advised delay in operation for several days until there is a safe margin of resistance. Other writers have since extended this time to several weeks.

Doubtless every one has observed that nature has given to the dog a greater protection against hemorrhage than exists in the human. In doing blood counts upon dogs it is often difficult because of the rapid coagulation of the blood. The writer noting this fact, the time of the coagulation of the blood was taken in fifty dogs and found to average 3 min. 28 1/10 sec. The average time for coagulation in the human, as taken by the same instrument in fifty individuals was 6 min. 45 seconds.

Length of time required for the coagulation of the blood of fifty dogs.

No.		Coagulating time.
1.	Setter	4:30
2.	Cur	2:30
3.	Cur	2:55
4.	Fox terrier	3:00
5.	B	3:15
6.	Fox and bull	3:00
7.	White fox T.	3:45
8.	Cur	3:30
9.	B	3:00
10.	B. Russian	3:30
11.	Cur	5:00
12.	Cur	4:00
13.	W. spaniel	3:15

No.		Coagulating time.
14.	Cur	3:00
15.	B.	3:00
16.	B.	2:45
17.	Yellow B.	4:00
18.	Fox B.	4:00
19.	Fox B.	1:50
20.	Cur	4:00
21.	W. Spaniel	2:40
22.	Cur	3:10
23.	Cur	3:10
24.	Cur	3:10
25.	Cur	3:10
26.	Bull	3:20
27.	Bull	3:30
28.	Yellow cur	3:20
29.	Cur	4:10
30.	B.	4:15
31.	Fox	3:05
32.	Cur	2:05
33.	Cur	3:15
34.	B. terrier	1:35
35.	Cur	4:05
36.	Fox terrier	3:05
37.	W. spaniel	1:55
38.	Cur	2:10
39.	Cur	3:10
40.	Cur	5:45
41.	Fox	3:00
42.	Cur	3:30
43.	Cur	4:00
44.	W. spaniel	3:15
45.	Setter	5:00
46.	Cur	3:30
47.	Cur	4:00
48.	Fox	3:00
49.	Bull	4:00
50.	Bull	4:00

Average 3 min. 28 1/10 sec.

There is therefore considerable difference in the time of coagulation of the blood of the dog as compared to the human. There is undoubtedly greater protection against continued hemorrhage in the dog because of this rapid coagulability of the blood. Again only one of the bitches was pregnant which was operated upon by severing the uterine and ovarian vessels in Dr. Robb's series.

Experiments upon dogs by the writer show that hemorrhage thus induced is much more profuse in pregnant bitches than in the nonpregnant, and while it seems impossible to kill by dividing the uterine and ovarian vessels in the nonpregnant, death occasionally results from the procedure in the pregnant bitch. In ten experiments of this nature upon pregnant bitches one died and the loss of blood as demonstrated by the pulse rate, was much greater than in a similar number of experiments in ten nonpregnant bitches. We all know, owing to the increased blood supply of the pelvic organs during pregnancy, how profusely a small wound made in the uterus or in fact in any part of the pelvis will bleed.

Without careful consideration of the above demonstrated facts, experiments upon animals in the study of this subject are of no practical importance. It is irrelevant to compare hemorrhage from other parts of the body to that which occurs from the torn vessels of a congested pregnant tube. The amount of blood effused into the peritoneal cavity from tubal rupture or abortion varies with each individual case and depends usually upon the portion of the tube which has been ruptured or eroded. Even in tubal abortion the amount of blood poured into the abdominal cavity is sometimes very great and may equal in amount that occurring in the most severe form of tubal rupture. A case recently operated upon by the writer eight hours after the initial hemorrhage showed the abdomen filled with blood, which had escaped from the fimbriated end of the tube. The ovum however was located within 1 inch of the uterus. The tube at this point was still unruptured and the attachment of the decidua had not been disturbed. Doubtless later, but just when would be impossible to estimate, a second hemorrhage would have occurred.

Our methods of diagnosis do not permit at present, therefore, to determine always the exact point of hemorrhage previous to operation. It is the opinion of most men that in the vast majority of cases the amount of blood thrown into the peritoneal cavity, either from abortion or rupture, is not sufficient to produce death at the time of the primary hemorrhage. In 5 or 6 per cent. of the cases of ruptured tubal pregnancies the hemorrhage is tremendous and the symptoms correspondingly grave. We find the patient pulseless and usually restless with the anxious look so characteristic of extreme hemorrhage. The blanched mucous membranes and deathly pallor indicate the gravity of the condition and at once suggest the diagnosis.

There must always be grave doubt whether hemorrhage in the latter class of cases will cease unaided, and it is the consensus of opinion that death usually ensues in a few hours if operation is not performed. The gravity of the symptoms indicate that the hemorrhage must escape from a large vessel or from an area which is extremely vascular. The writer has seen two of this variety where immediate operation was considered necessary, and was performed with recovery.

In order to show what progress has been made in the treatment of this accident in the last forty or fifty years let us refresh our memory by referring briefly to literature of that date. Meigs in his book on "Woman and her Diseases" 1859, after a graphic description of death from hemorrhage in several cases of ectopic pregnancy says "What, alas! can we do in these cases? We could make an incision in the abdomen and clear away the coagula and serum; but who is he bold enough to do so? There is no such wise and bold surgeon, and therefore nothing remains for us but to extend all the relief within the narrow boundaries of our power and submit to the inevitable end." This quotation expresses the sentiment of the leading men of that time.

Parry, in 1876, gathered the statistics of 499 cases of ectopic gestation. Of these 336 died and 163 recovered—a mortality of 76.2 per cent.; 174 died at, or a short time following rupture, an immediate mortality of 52.8 per cent. He says: "The opinion has long prevailed that tubal pregnancies are peculiarly fatal, and there can be no doubt that it is correct—of 149 cases in which the ovum was located in that portion of the tube which does not traverse the tissues of the uterus, 145 died." It seems evident that the cases which were recognized in those days were severe in nature. Hemorrhage from tubal pregnancy is doubtless recognized more frequently now because of our improvement in the interpretation of symptoms. Thus, very mild cases are seen which formerly passed unnoticed. Parry said, "Here is an accident which may happen to any wife in the most useful period of her existence, which good authorities have said is never cured and for which even in this age when science and art boast of such high attainments, no remedy either surgical or medical has been tried with a single success."

Lawson Tait states that he was concerned directly and indirectly in the postmortem examination of twenty-six women, who had died from hemorrhage into the peritoneal cavity from ruptured ectopic gestation. In the year 1883 this daring and brilliant operator taught us that it is possible to reduce the mortality of this terrible accident to less than 3 per cent. for, in the six succeeding years, he operated thirty-nine times with but one death.

History teaches us therefore that before the days of abdominal section many women died from this accident. A search of the literature of the present day shows that many deaths still occur. The mortality has undoubtedly been reduced from the high rate above referred to, to less than 8 per cent. and this percentage is taken from the work of many operators. Some operators report a rate of 2 per cent. and less. This great improvement in mortality shows that the results from operative treatment have been most brilliant. Also, that the greatest consideration must be extended toward all theoretical statements tending to change our views upon this important subject. In the case where hemorrhage has ceased and when reaction is taking place there is doubtless little danger of recurring hemorrhage for a few hours. The cases above reported demonstrate that when arterial tension becomes higher hemorrhage may recur. When this may happen is entirely speculative. That it does not recur in a large percentage of the cases does not justify the teaching that it will not recur in any.

Recent papers have served an important purpose, because they have emphasized the fact that the patient usually rallies from the primary hemorrhage and that it is unnecessary as a rule to operate while the patient is in extreme shock. It is undoubtedly true that in a large percentage of the cases, a few hours can be well spent in allowing a patient to react so that operation will be attended by less danger. That it can be postponed indefinitely without great risk to the patient has not been true in the experience of the writer. It is unnecessary to dwell on the dangers of peritonitis, intestinal obstruction and prolonged convalescence which will result occasionally if operation is indefinitely postponed.

In the graver forms where there is evidence of continued hemorrhage immediate operation should be performed. Additional shock caused by operation should not be considered, for here, as in hemorrhage in any other part of the body, the only treatment that can be advised is to ligate the bleeding vessel. An opening into the abdominal cavity is a small matter and the result will depend entirely upon the method of this procedure. There is no time for deliberation or precise and careful technic in the performance of this operation. The limbs of the patient should be firmly bandaged. Saline transfusion is begun, while the ether is being administered. Light ether anesthesia for fifteen or twenty minutes is a good stimulant. It is unnecessary to stand the patient on her head by using the extreme Trendelenburg position, thus increasing shock by pressure against the diaphragm and a lagging heart.

Thirty seconds only are required to open the abdomen. There are no vessels in the abdominal wall to ligate, as the tissues are blanched and free from blood. To grasp the bleeding tube and remove it requires less than five minutes. To clear the pelvis of the largest clots and close the abdomen should be done in a few minutes and the operation is complete. There is improvement in the condition of the patient while on the operating table. No harm is caused by the blood left in the abdomen, and additional shock incident to its removal has been avoided. This operation can be safely performed in the home of the patient if the surroundings are not prohibitive. Few assistants are necessary and now when good nurses are so plentiful it is a mistake to insist absolutely upon removal of the patient to a hospital. It is especially true in this operation that the more expert the operator the better will be the result. I desire to thank Dr. W. A. Nealon for his kind assistance in this work.

WESTINGHOUSE BUILDING.

DISCUSSION.

DR. H. W. LONGYEAR, of Detroit, said there should be no hesitation by the abdominal surgeon in expressing the same opinion as the author of the paper, regarding the necessity for immediate operation in cases of recently ruptured tubal pregnancy. There was only one class of cases in which he would defer immediate operation and those were instances of old rupture. He had seen very few such cases where the rupture had occurred three or four weeks before, and where there had not been a correct diagnosis made at the time, and where the patients had gotten up and he had been called in to see them subsequently. In these cases there was no question about ruptured ectopic gestation having taken place with hemorrhage into the abdominal cavity, but these hemorrhages did not recur. In those cases where the absorption of the clots had taken place, it might not be necessary to operate, but in recent cases of ruptured tubal pregnancy, operation was justifiable.

DR. HUGO O. PANTZER, of Indianapolis, said that standing as we did in the presence of this class of cases oftentimes, too in the presence of doubt, we could hardly decide otherwise where life was menaced than to chance it with the doubt in favor of an operation. He heartily endorsed the paper.

Dr. William H. Humiston, of Cleveland, said there should be very little trouble in making a diagnosis of ruptured ectopic pregnancy. A careful taking of the history, followed with the symptoms that constantly came on, the condition of the patient, supplemented with a careful examination, would leave scarcely any doubt in the great majority of cases as to the condition present. If the rupture was sufficient to cause shock, one could not tell whether the shock would be overcome or not, and he did not hesitate to operate upon all of the cases that came into his hands whether the patients were in shock or not.

A very important patient in Cleveland was allowed to die by waiting twenty-four hours for reaction from the shock to occur. The operation was started after twenty-four hours while the woman was still in shock and she died upon the table. In this case there were twenty-four hours of time wasted. He had taken these patients when they were almost pulseless, and largely with submammary injections of hot saline solutions and with the effect of the stimulation of ether by the drop method, had opened the abdomen in a few seconds, felt the fundus of the uterus, found on each side whether rupture had taken place or not, put a clamp on the cornu of the uterus and another on the broad ligament near the pelvic wall to control hemorrhage temporarily at least, and from that moment the patients would begin to revive; then one could perform the operation in a few minutes, and if he was aseptic in his technic in closing in the clots, the peritoneum would take care of them. He had been blessed with a *nil* mortality in his ectopic pregnancy work thus far.

Dr. Thomas B. Noble, of Indianapolis, said that a year ago or more, Dr. Robb, at Chicago, presented his paper relative to this subject in which he advocated procrastination in some cases. The speaker took occasion at that time to take decided issue with him and said that it was bad teaching; that women would die as the result of such teaching. He subscribed *in toto* to the views advanced by the essayist and affirmed again that practitioners would have to be taught and re-taught that these cases should be operated on immediately. By this he meant as soon as the diagnosis was reached, preparation should be immediately made to do a quick and proper operation. Some operators would have a mortality along this line greater than others because some would occupy twice or three times as much time in doing the same work as others. These cases would not bear long tedious tinkering or extra careful surgery, but they would bear direct, prompt, quick work.

Dr. A. B. Miller, of Syracuse, N. Y., favored operating on these cases of ruptured ectopic pregnancy as soon as the diagnosis was made, and said that his success in treating this class of cases had been very fortunate from early operative interference. In over a hundred cases that he had operated on there were only three deaths. When it came to the technic and method of operating he endorsed *in toto* what the author of the paper had said, believing that he had adopted the proper method.

Dr. John Young Brown, of St. Louis, Mo., said that during the last six or seven years he had been in a position where he had come frequently in contact with cases of intraabdominal hemorrhage as seen in gunshot wounds of the liver, of the mesentery, of the spleen, and quite a large number of cases of ectopic pregnancy in which rupture had taken place, and he had never been able to figure out from this experience why it was that the gynecologists differed as to the proper time for treating such conditions. With the modern methods we had of combating shock, and particularly the use of salt solutions, of hypodermoclysis by the method which Andrews had accentuated in the treatment of gunshot wounds, where the hemorrhage was severe, in buttonholing the upper abdomen, as soon as the abdomen was open and starting salt solution to flow immediately upon the opening of the abdomen to combat the shock, if not for the purpose of irrigating, a large majority of these patients could be saved by prompt action.

Dr. Albert Goldspohn, of Chicago, referred to recurrent hemorrhages in these case and said that in over eighty cases of ectopic pregnancy that he had dealt with in one way or another he had only known two patients to die from that affection who were not operated on. This showed that nature under these disadvantageous circumstances, where infection was almost certain to follow, where bungling was pretty sure to occur on account of the ignorance of the operator, would do better than these imperfect substitutes of surgery.

Dr. C. C. Frederick, of Buffalo, had seen about 135 or 140 cases of ectopic pregnancy in his city. About 5 per cent. of these had been rapidly bleeding cases; the other 95 per cent. were cases in which rupture had taken place and the patients had recurrent hemorrhages sometimes for a period of two or three or four weeks, or five or six months. He had operated on women who had had recurrent hemorrhages five or six months after primary rupture had taken place. In one case hemorrhage stopped and the woman never had another rupture, and was not operated on. He had operated on patients for ruptured tubal pregnancy ten years ago and found the remains of these pregnancies in the abdomen. So there was a class of cases in which the hemorrhage would occur once or twice and then stop. There was another class, the 5 per cent. class, in which hemorrhage would begin and they would bleed off and on until they died. He had seen five such women die within twenty-four hours from the time the hemorrhage started. He took the position that every case of ruptured tubal pregnancy should be operated on at the beginning, and if such women had recurrent hemorrhage they should be operated on anyway.

Dr. Maurice I. Rosenthal, of Fort Wayne, emphasized the point that in practically all of the cases the moment hemorrhage stopped the pulse began to improve. He had done a number of these operations, several of them every year for ten or fifteen years. He recalled three cases in which death occurred. These were all cases that had gone on for some time after the first evidences of ectopic rupture. Since then he had made it a rule to operate at as early a date as possible. He reported two cases of mistaken diagnosis.

Dr. E. Gustav Zinke, of Cincinnati, said he had no desire to take part in this discussion, but knowing that the proceedings were being reported and would be read abroad as well as in this country, we could not afford to have the discussion closed without shedding light upon a few points which might elucidate some of the questions at issue. In his opinion it was just as wrong to say that every case of ectopic gestation should be operated on, as it was that every case of ectopic gestation did not need operation. There were patients who recovered without operation, and this fact should not be forgotten. He knew of instances, as did other members of the Association, in which operation was proposed with counsel and without counsel, was refused by the family, and the patients recovered. It was very essential to understand the pathology of ectopic gestation. Speaking merely of ruptured tubal pregnancy was not correct. It did not cover the ground. In one instance there was a rupture into the peritoneal cavity, while in another there was a rupture between the walls of the broad ligament which was an entirely different matter, and then there was tubal abortion without rupture of the tube. The ovum, young as it was, might be discharged from the tube into the peritoneal cavity and be absorbed and the patient recovered without operation. Time and again cases had been reported of tubal rupture between the layers of the broad ligament, the hemorrhage arrested, hematoma formed, and the patients had recovered without operation. Even adhesions in these cases had been known to disappear.

Dr. J. H. Carstens, of Detroit, said that when a woman was suffering from an internal hemorrhage she ought to be operated on whether the hemorrhage was due to a tubal abortion, a ruptured tube, or to the forcing of the fetus into the broad ligament. Unless he operated on these cases of ruptured ectopic gestation promptly and arrested the hemorrhage, he did not sleep well.

ARTIFICIAL ANUS FOLLOWING OPERATION FOR INTUSSUSCEPTION. THREE YEARS COMPLETE OCCLUSION OF LARGE BOWEL; METHOD OF RESTORING CONTINUITY.[1]

BY
JOHN YOUNG BROWN, M. D.,
St. Louis, Mo.

During a visit to my old home in Kentucky last June, I was called in consultation by Dr. Archibald Dixon, and Dr. Webb, of Henderson, to see a most remarkable and interesting case which I wish to report very briefly. Taking the case all in all, it is one of the most interesting I have ever encountered.

The patient's first attack was diagnosticated as one of appendicitis. During the second attack, for seven or eight days he had obstruction of the bowels, possibly due to the peritonitis which resulted from an appendicitis operation which was performed on him. This operation was done in the country by a country physician, who took a trocar and stuck it in the median line, and then began to enlarge the opening with his knife. Through the enlarged incision there was evacuated quite a large quantity of pus and fecal matter, and the artificial anus, which was established, with the fecal fistula, undoubtedly saved the patient's life. When I saw the patient the conditions I found were these: there were the remains of the median incision, and protruding from this median incision was the everted bowel, the bowel being turned wrong side out, and at the location of the intestine with the skin margin there was an artificial anus through which all fecal matter had passed for three years and a half, there being complete exclusion of the entire large bowel for that length of time. The patient had not had a natural bowel movement during all this time.

I had an opportunity of examining this case and demonstrated it before the county medical society. The boy undoubtedly did not have appendicitis, but the original condition was an intussusception. The second attack resulted in intestinal obstruction, with peritonitis and toxemia incident to the distention of the bowel above the peritonitis. The use of the trocar in this case had relieved the obstruction by making an artificial anus, and the intussuscepted bowel protruded at the point of least resistance. The next morning I operated on the patient at the city hospital in Henderson, making a median incision, and the conditions I found demonstrated the correctness of my conclusion.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

One of the most interesting features of this case was the condition of the ileum from an obstructed band to the ileocecal valve. As I have said, this entire large bowel was out of commission for three and one-half years. This most remarkable condition was an ileoitis obliterans, the ileum having contracted and swollen to such an extent that it was almost impossible to get a small grooved director through it. The appendix, as I thought prior to the operation, had not been responsible for this condition. The appendix was free, but showed that it had participated in the peritonitis brought about by the intussusception and the fecal leakage, but to all appearances this was a secondary and not primary incident.

The question came up as to how the intestinal continuity could be restored. I did not know when I started the operation. Many adhesions confronted me, and prior to that I demonstrated the various methods by which bowel continuity could be restored. On opening the abdomen I found there were very few adhesions, and without the slightest difficulty I was able to resect well back into healthy tissue, cut off the ileum at this point (illustrating on black board), obliterated the ileum, and treated it in the same way as I would the stump of an appendix. I cut it off, put a purse-string suture around it, removed the appendix, blind pouching the end of the ileum, and with a clamp and suture I did a lateral anastomosis, turning the fecal current back into the large bowel. There was some contraction in the lumen of the large bowel, but not enough to interfere with the lateral anastomosis.

But the most interesting feature of the case was the obliterated ileum. I feel that one of the principles we should observe in all cases, whether we resect a gangrenous bowel, or resect the bowel mucosa, which may be protruding, is to go well back into healthy tissue. If I had attempted to restore this, the probabilities are intestinal obstruction would have resulted. By blind-pouching this, it would put back into commission the large bowel. In twelve hours after the operation the patient was passing gas, and in twenty-four hours he had a profuse diarrhea, which was checked with considerable difficulty.

I am becoming more and more convinced every day that the statement which has been made, namely, that the large bowel is absolutely useless, is correct. On many occasions I have put out of commission the entire large bowel, and it has not particularly interfered with the functions of the patient other than that of passing fecal matter through his anus. I recall a case that I reported at St. Louis before this association, where I took the entire large bowel out, and did an end-to-end anastomosis to the ileum and sigmoid. This patient was a very large woman, and was operated on for a strangulated umbilical hernia. She weighs between two and three hundred pounds. She was reoperated for peritonitis, her abdomen being simply opened and drained. I do not know what the peritonitis was due to; but she has no appendix; she has no large bowel except the sigmoid, and possibly the peritonitis was due to her tubes.

I have been doing a good deal of intestinal work, especially with reference to partial exclusion of the large bowel by performing lateral anastomosis in cases of mucous colitis, with gratifying results. Lane, of England, who has written extensively on this subject, thinks that many cases of chronic constipation are amenable to no method of treatment except surgery. From some skiagraphic work I have done after injections with bismuth, and having examined cases carefully with a view to the mechanics of the condition, I am inclined to think that he is correct in his conclusions. He was the first, I believe, to advocate the removal of the entire large bowel for cases of obstinate chronic constipation and intestinal toxemia as the result. He has since then receded a little from his first attitude and now resorts to lateral anastomosis. Lateral anastomosis is not a simple operation, and the work to be done in the future in this regard must be governed very largely by what is done on the large bowel.

I simply report this as a unique case, this patient being now in perfect health. All of his functions are practically normal. One point of great interest, as I have previously said, is the fact that he went on with the large bowel out of commission for three years and a half. The other point of interest is the obliterative condition of the ileum and the method by which bowel continuity was restored.

612 Metropolitan Building.

The President, Dr. William Henry Humiston, of Cleveland, Ohio, then delivered the annual address.

THE GILLIAM OPERATION FOR RETRODISPLACEMENT OF THE UTERUS.[1]

DISCUSSION.

President Humiston expressed a desire to have his address discussed.

Dr. Albert Goldspohn, of Chicago, said he was very glad that some one, who did not advocate the Alexander operation, or bi-inguinal laparotomy for retroversion of the uterus, but advocated some other procedure, was following the tactics of some twenty other Alexander men, who were driven by the pressure of the general profession opposed to the Alexander operation to follow up their cases carefully years after such operation and examine the women. The Alexander men had got hold of more than 25 per cent. of their cases, and personally he had kept track of as high as 45 per cent. of his own cases. This was the only method of establishing facts in regard to this operation. He had repeatedly challenged the gentlemen of the Baltimore School, who were the fathers in America of ventrosuspension, to go after their cases, report them after the women had been confined and see what the position of the organs was. These gentlemen had taken these challenges in a wonderfully meek manner, as their results were such that they had better not be published.

Dr. H. W. Longyear, of Detroit, did not think a uterus that was retrodisplaced in the third degree before pregnancy, whether it was in the nature of a retroversion or a retroflexion, ever got well after pregnancy had occurred, without operation.

Dr. Alexander Hugh Ferguson, of Chicago, thought we should avoid mentioning names in connection with the technic of any operation and stick to the principles involved. For instance, for the Alexander operation, we should speak of the inguinal operation on the round ligaments, and when the uterus was brought forward and kept in place by the round ligaments being taken up through the recti muscles, then the proper name was anterior transplantation of the round ligaments for the support and suspension of the uterus.

Dr. Edwin Walker, of Evansville, Indiana, said that one difficulty he had encountered after all of these operations, and he had performed all of them, was that the cervix hung down too much, and patients frequently were not relieved of their symptoms. He believed that the Gilliam and other operations would sooner or later be given up as none of them quite filled the indications, but he did not know what the solution was going to be. Some operators were now utilizing the round ligaments behind the uterus, but he did not know whether this would prove to be satisfactory or not.

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[1] For original article, see page 721.

Dr. Carstens, in closing the discussion for Dr. Humiston, who was called out of the room, said there were all kinds of cases, hence the reason why so many different operations had been devised and advised to meet the indications in each particular case. In some cases he did an anterior Dührssen operation, or a Mackenrodt operation through the vagina, but only one or two a year. In other instances he might see fit to do a ventrofixation, particularly in women who had passed the menopause, or a vaginal hysterectomy. All things considered, it was a question of natural selection, the survival of the fittest and adaptation to environments.

SOME PERSONAL EXPERIENCES IN GALL-BLADDER SURGERY.[1]

BY
HERMAN E. HAYD, M. D., M. R. C. S. ENG.,
Buffalo, N. Y.

Biliary drainage is exceedingly important in the treatment of the associated complications of cholecystitis and cholelithiasis, and is best accomplished through the gall-bladder. A few years ago many good surgeons and operators advocated the removal of the gall-bladder when this viscus was diseased, and in doing so they did not then realize that they were robbing the patient of the most powerful agent for the cure of his symptoms—namely, biliary drainage. At that time, in support of the idea that the gall-bladder was a useless appendage and was simply a reservoir for the storage of bile, there appeared numerous articles in the journals, written by biologists and comparative anatomists, (notably one by Woods Hutchinson in the *Medical Record*, May 16, 1903), by analogy contending that because certain animals had no gall-bladders, man could do without his, and this was especially plausible when it could be shown that a number of persons had had their gall-bladders removed and were in good health. Soon, however, the pathologist and clinician found that with acute and chronic gall-bladder disease there often existed secondary and dangerous complications, as cholangitis and pericholangitis, hepatic congestion and biliary cirrhosis, jaundice and pancreatic affections; that drainage was a necessary and perhaps all-important part in their treatment, and that it could be best done through the cholecyst.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Some surgeons have taken the position that equally effective drainage could be accomplished through the choledochus, but Deaver has well said that such a procedure is not good surgery. First of all, it is not scientific to drain foul and septic bile into the duodenum; not only because it might irritate the bowels, but because absorption might again take place through its mucous membrane, and that the most effective way to get rid of this dangerous material is to discharge it from the body through the gall-bladder at the abdominal wall.

Bland Sutton in a very interesting paper which he read before the surgical section of the British Medical Association in 1907, and which provoked a very spirited and animated discussion, took the position that the gall-bladder is a useless organ without function, a menace to life when diseased, and should always be removed. Three weeks after this discussion there appeared in the *British Medical Journal*, October 26, 1907, an equally important paper by Mayo Robson, who maintained that the gall-bladder served a very useful purpose, and should always be retained unless too seriously damaged; and Deaver, in a masterly article printed in the *American Journal of the Medical Sciences*, April, 1908, argues in a most conclusive manner that the gall-bladder should only be removed under certain grave conditions, or when its walls are so seriously involved and thickened as to render it absolutely useless; not alone because if left, it is the most direct and best drainage channel, but because it is needed by the economy to propel the bile on into the intestines by reason of its tension bulb-like action and, in proof of this function, he cites the fact that when the organ has been removed the stump is often found considerably dilated into a sort of diverticulum or secondary gall-bladder.

Another interesting point which adds weight to Deaver's contention, I have observed in my own work—namely, that after the removal of the gall-bladder and also after a simple cholecystostomy, the abdominal incision has broken open some weeks after it had been firmly united, from this great back pressure of bile; and in cases where a patent common duct existed, which was proven by the fact that much free bile was always present in the stools, clear urine was voided and there existed no jaundice even in the conjunctiva.

The old argument that stones recurred in the gall-bladder after drainage had been practised, has been pretty well disproved by the work of Kehr, Mayo, Murphy, and Deaver, who combinedly have done over three thousand gall-bladder operations, and in their experience a recurrence of gallstones has been so rare as to make them believe that they were overlooked at the time of operation and were not due to reformation or a recrudescence of the original inflammatory process. Kehr had 2 1/2 per cent. return.

Another objection to the retention of the gall-bladder was the long drain of bile for weeks and sometimes months, which was not only annoying but very distressing, and possibly caused the existence of a permanent fistula. Biliary fistulas which require operative measures for their relief are exceedingly rare, owing to a better technic in the performance of cholecystostomy. Heretofore the gall-bladder was sewed securely to the abdominal wall, but now the careful surgeon sews his drainage tube into the gall-bladder, and then pursestrings the tube so as to avoid leakage of bile, and in case the gall-bladder falls some distance away from the abdominal wall, he surrounds the tube with a little gauze which is carried through the incision and thus a drainage canal is made by adhesions and not by permanent fixation of the gall-bladder. Mucous fistula, on the contrary, require the removal of the gall-bladder, because they have a different pathology, and in order to stop the chronic oozing, the contracted, distorted gall-bladder, which usually has a stone or stricture in the cystic duct, must be ablated.

It is now generally accepted that gall-bladder disease is the result of bacterial invasion, not only from the intestines through the common duct—which is perhaps the most frequent avenues—but also by way of the portal circulation. Organisms of various kinds are absorbed by the tributaries of the portal vein, are carried into the liver substance, and then find their way into the gall-bladder and, under farvorable conditions, develop a catarrhal or inflammatory process with their associated products. If the infection is severe, an acute cholecystitis results, with the formation of mucus and pus, but not gallstones, and the inflammatory action may be so destructive as to cause ulceration and gangrene and perforation of the bladder wall. Gallstones, however, require for their production a low grade infection with a certain degree of bile stasis, and as a result of this infection we get a proliferative inflammation of the lining membrane of the gall-bladder, and the cells thus produced undergo myelin degeneration, with the formation of cholesterin. The deposition of this cholesterin upon an organic nucleus of blood, pus, mucus, bacteria or any foreign material like silk or catgut, together with accretions of the different bile salts, produces stones of various colors, sizes and composition.

Gallstones usually form in the gall-bladder, but they are occasionally found in the hepatic ducts and bile radicals, and from these different sources find their way into the common duct, where they may remain lodged in its lumen or at the ampulla of Vater; or make their way into the duct of Wirsung; or they may be discharged into the bowel, and are then often collected by sieving the stools. Gallstones may exist and remain in comparative innocence in the gall-bladder and produce very few symptoms other than perhaps the various digestive disturbances peculiar to chronic gall-bladder disease, but if for any reason the bile ducts become more or less obstructed so that the free flow of bile cannot take place, then symptoms varying from slight distress to the greatest agony are complained of. It is believed that attacks of pain are usually the result of the movement of the stones either in the bladder itself or in their passage into the cystic duct, or in their exit through the common duct, together with the co-incidental irritation, inflammation and distention of the gallbladder and the ducts, so that biliary colic or pain is the most common and distressing symptom of calculus disease, but it is also frequently present in gall-bladder disease without stones. The pain is usually referred to the region of the gall-bladder and the pit of the stomach. It often extends to the base of the right scapula or between the scapulæ and runs sometimes into the right shoulder and down the right arm and but rarely to the left side.

Jaundice is a very important symptom, and varies in intensity from a slight staining of the conjunctiva to the most intense bronzing of the skin. It is a variable symptom, and its importance and frequency is variously estimated by different observers. Some say that it exists in only 20 per cent. of the cases, while others claim that it is present at some time in the history of the case very much oftener. It is due to obstruction of the common or hepatic ducts, either from within by stones or stricture, or to adventitious bands and adhesions or growths, angulations and distortions pressing upon their lumen from without. It may also be due, however, to a large stone perhaps impacted in the cystic duct and pressing upon the hepatic at or near its junction to form the common duct. It may be temporary or persistent in character, and depends whether the cause remains stationary or transitory, and the degree is usually in direct proportion to the amount of obstruction. Nevertheless, it is often not present and many capable practitioners have been led into fatal mistakes, and useful lives have been jeopardized and sacrificed by waiting for jaundice before a correct diagnosis was made of calculus disease.

I wish here briefly to give the history of a case which is by no means uncommon because, in my experience, many of my most dangerous operations were performed on persons in whom no jaundice was present, nor could I get any account of its previous existence.

Mrs. L., aged fifty-one; the mother of ten children; a large, stout, fleshy, active woman, whom I saw in consultation with Dr. Hitzel, and diagnosticated gall-bladder disease with gallstones. She had been in bed for two weeks, and her suffering at times was so intense that half a grain of morphia was injected hypodermically. The pains usually came on at night about three or four hours after eating supper. She stated that in none of her confinements did she suffer as in one of these paroxysms. I sent her to the German Hospital, and kept her under observation for a few days. She had no temperature at any time, and twice it was necessary to inject morphine to relieve her pain, and at no time could I elicit pain even upon deep pressure over the gall-bladder, nor could the distended organ be felt through the thick abdominal wall. On the morning of the operation, March 13, 1909, she was slightly jaundiced in the conjunctiva and skin. Upon opening the abdomen along the line of the right rectus muscle, the gall-bladder was seen to be very distended and dark in color. After packing gauze carefully and deeply into the fossa (behind the liver), the gall-bladder was opened, thirty-eight stones were removed, together with considerable brownish, ropy fluid. After all the stones were withdrawn by forceps and spoon and the bladder made as clean as possible by very free irrigation, the gauze packs were taken out, the ducts carefully examined, and two large stones were felt deep in the cysticus. An attempt was made to milk them back into the gall-bladder, but this was only partially successful; one was dislodged and delivered through the bladder, but the other was so firmly wedged that every effort to move it was of no avail, so the duct was opened from without, and the stone was removed through the opening. It was large and cone-shaped, and evidently filled to distention the apex of the duct, pressed upon the hepaticus and caused the jaundice.

The gall-bladder was then separated from the liver and removed after the stump had been carefully tied off and a drainage tube wrapped in gauze was placed to the bottom of the cavity.

The woman reacted well and had an uninterrupted convalescence; on the eighth day the drain was removed and a smaller piece of tubing was pushed into the wound, as no bile had escaped thus far. On the eighteenth day she complained of great pain over the wound, so hot linseed poultices were applied and frequently changed, and on the following day bile discharged freely from the incision which had opened up. It increased in amount for several days, and then gradually ceased.

In this case the bladder was not seriously crippled, and I nemoved it simply because I had split the wall so far down, in order to get the stone out of the cystic duct. A stricture, no doubt, existed in the duct, as no bile flowed immediately after the stone was extracted, and it evidently did not yield for many days, because no bile was discharged along the drainage tract until the eighteenth day, when either the cut in the cystic duct opened or the edges of the tied-off gall-bladder separated from the great *vis a tergo* pressure of the bile current.

Another patient upon whom I operated January 29, 1907, had a history of repeated attacks of pain for three years, and then periods of comparative comfort, occasional chills and fever for a few days, but no jaundice. I removed from a healthy-looking bladder four beautifully facetted stones deep down in the cystic duct, which when approximated made one large round concretion the size of a hickory nut. At the time of the operation I thought the cysticus was open and expected that bile would flow freely from the drainage tube, which was pursestringed into the bladder. No bile was ever discharged, but a mucous fistula continued for nine months with periods of acute suffering; and on September 1, 1907, I operated a second time and removed the gall-bladder and found one small stone deep in the cystic duct, which was overlooked at the first operation. The bladder was small and contracted, but its coats were not specially thickened, and I have no doubt there would have been no trouble occasioned by its retention. It was, however, easier to get the stone when the bladder wall was split down and, therefore, a cholecystectomy was performed. The stump was tied off carefully, but the ligature slipped and a profuse hemorrhage resulted; after some little time the vessel was found and securely occluded, and the wound was quickly closed with drainage. Bile discharged from the wound on the sixth day and continued to flow. The patient did well and has remained in excellent health.

These are the only two cases in a series of twenty-eight in which cholecystectomy was done, and of the remaining twenty-six many were acute empyemas, and six had thickened and contracted gall-bladders, but bile oozed through the duct after the stones were removed, so it was thought best to leave the bladder and drain. All did well and have enjoyed good health since the operations.

One case was an inoperable cancer of the gall-bladder in a woman sixty-two years of age. Two patients died, one a stout, young man of forty years of age, whom I had treated for years for syphilis.

I saw him first on March 22, 1906. He was dressed and about his room, but complained of pain and tenderness in the pit of the stomach and was vomiting, which he had attributed to bowling the night before and a little too much beer. I made the diagnosis of gall-bladder disease, and put him to bed. His temperature was 99 4.5. On the following day he was worse, his temperature had risen to 102 2.5 and his pulse was 116; I saw him again in the evening, as I considered him seriously ill, and on the following day his temperature was 104 and pulse 130. There was no jaundice. I took him at once to the German Deaconess's Hospital and operated. I found a very acutely inflamed, enormously distended bladder, with no stones and no adhesions, but there was considerable brownish fluid in the peritoneal cavity; over a pint of pus, mucus and bile was washed out of the bladder, a tube was sewed into the viscus and the wound closed. The operation was simple and done with dispatch, yet the man died four hours afterward. A postmortem was not permitted.

The second was a woman thirty-eight years of age, the mother of six children, youngest nine years old, whom I operated upon April 10, 1908, at the German Hospital. She had been in bed one week, was jaundiced—although not deeply—and was suffering from pain and tenderness over the pit of the stomach, with nausea and vomiting. She had a temperature of 100 1 2 and pulse 90. Upon opening the abdomen, I found the gall-bladder very small and contracted, in a dense bed of adhesions. Upon section it was found to contain two small stones and a little mucus. After separating what seemed to be a solid mass of exudate, I came upon the head of the pancreas, which was much enlarged and hard as a stone, probably a carcinoma. Bleeding was very free, and the abdomen was closed after leaving a piece of gauze in the wound. The woman died twelve hours after the operation from shock and hemorrhage, and upon postmortem examination, the pancreas was found to be the seat of scirrhous cancer. This fact I did not know until I had done much damage by fruitless tearing of adhesions, because, finding a contracted gall-bladder, I proceeded to expose the ducts.

Courvoirsier's law, which is a very useful guide for the surgeon, would have misled me in this case. He says "that in 84 per cent. of the cases of chronic jaundice, due to obstruction of the common duct, a contraction of the gall-bladder signifies that the obstruction is due to stones; a dilatation of the gall-bladder, that the obstruction is due to causes other than stones." My patient evidently had an old gall-bladder trouble with the production of stones, and a gradual contraction of the organ took place with stricture of the cystic duct and superadded cancer of the pancreas.

In the practice of surgery certain methods of procedure come to us as a result of our own experience, together with the study and careful analysis of the work of other men, and therefore as a general proposition to which, of course, there are some exceptions, I would say that, in my judgment, the gall-bladder should be removed.

1. For acute cholecystitis with gangrene.

2. In chronic cholecystitis when the organ is so thickened and contracted that its future function—if there be one—could not be restored, and where the cystic duct is closed, and, therefore, it could be of no use as a drainage channel.

3. In hydrops where we have a large bladder and cystic duct obstruction.

4. In cancer.

5. In gunshot injuries or perforations from accidental causes, if a partial cholecystectomy is not advisable or possible.

In conclusion I beg to add that the argument which I have endeavored to make in this paper is that cholecystectomy has been performed altogether too frequently during the past ten years, and that it is often an unnecessary operation. That it has a higher mortality than simple cholecystostomy; that it takes much longer to perform; that the percentage cures of our patients are greater when good drainage is sought for and carried out and that this drainage is most effectual through the gall-bladder by way of the abdominal wall; and that the post-operative ad hesions after cholecystectomy are greater than after cholecystostomy, and as a result, perhaps future suffering. And, finally, if for any reason surgery may again be necessary, the dangers and difficulties are much increased by reason of the absence of the gall-bladder, which is always of service as a landmark to distinguish adjacent structures.

Deaver says

When in doubt, I say drain rather than remove a gall-bladder which may recover itself; better do this even at the expense of a fistula (mucus) which will call for a second operation, than take out a gall-bladder which may again normally functionate. Better, I say, do two operations, in an attempt to save a gall-bladder that may recover itself, and in not a few of these instances save a human life at the same time, than do an operation which will certainly sacrifice the one, if not both.

403 Delaware Avenue.

HOW CAN WE BEST EDUCATE WOMEN TO SEEK RELIEF EARLY FROM CARCINOMA OF THE UTERUS?[1]

BY

CARLTON C. FREDERICK, M. D.,
Buffalo, N. Y.

As such a very large proportion of cases of carcinoma of the uterusr each the operator too late for successful radical operation, its eems that the various factors which are at work producing this state of affairs should be studied and analyzed, with the view ofan attempt to define some plan of procedure or education by which a change of such conditions may be brought about.

All pelvic and abdominal surgeons will agree that more than 50 per cent. of all cases of carcinoma of the uterus and more nearly, 80 per cent. to 90 per cent. present themselves at a stage too far advanced for the operator to promise success. With malignant neoplasms of the breast, the same used to be true, but the public are becoming more alive to the necessity of early operation and a very small percentage of women now allow a lump in the breast to go far before consulting a physician.

To a limited extent, the more intelligent women are coming to a realization of the urgent necessity of early operation for carcinoma of the uterus and are learning some of the symptoms of that dire malady. If a woman were to lose as much, or even a minor percentage of blood from any other orifice, as she does from the vagina when flowing excessively, how long would she refrain from consulting her physician? It is the old story of familiarity which breeds contempt.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

Gradually as carcinoma or any other pathological lesion of the uterus grows, the flow increases in quantity and duration and the woman becomes familiar with it and thinks this time that it will stop just as it did before, hence hopes it will be better next time. Besides all this, is she not at the period of the menopause, between forty and fifty? and, Mrs. Smith, her neighbor, used to flow profusely when she had her change but is now all right. She may have consulted her docter; he didn't examine her and suggested the same idea, change of life, which would relieve her of all her troubles when she has once finished it. It is this fetish of the menopause, and the belief in necessity of profuse bleeding at that period, which holds so strong a place in the mind of the laity, which has been fostered by the medical profession, and which has been the cause of the sacrifice of so many lives among women of all nations and all times.

If we could but teach the family doctor to insist on an examination of his patient, and to point out the well attested fact that too frequent and too profuse bleeding from the uterus is pathological, and that its cause should be sought out, it would be well. He should not gloss over the condition by surmising that it is due to the period through which the woman may or may not be passing. True, it is, that sometimes women do flow profusely at the time of the climacteric and escape without having any severe pathological lesion to account for it. But, right here, there is usually a condition which is not taken into account and without being given due thought and reasoning is considered to be a parallel case to that of the woman who has a pathological lesion and flows not only too much and too long, but also too frequently —namely, the woman who flows profusely at her period when she probably has not menstruated for two or three or four months, has a physiological reason for its being profuse, and the old neighbor woman and the complacent family doctor do not recognize the difference between too profuse a flow at regular or too frequent intervals and that which comes months apart, due to the irregularity of the "dodging period," which is simply a compensatory flow, making up the general average. That flow is not due to a pathological lesion; it is simply natural to lose in one period all she would have lost in the two or three or four she has passed. But even that woman should be examined;

for I would lay down and enforce the rule, were it possible so to do, that every woman, young or old, should be thoroughly examined, whenever she flows too frequently or too profusely for any number of periods in succession.

We all have had patients brought to us by the attending physician, telling the tale that he wanted to examine his patient when she first came to him a year or so ago, but she would not submit to it, and this is his excuse for not having found out the true condition. We all believe, we all know that this is the merest foolishness. If the doctor whom a woman consults insists and, at the same time, forcefully explains the necessity of his finding out at once the conditions, not one woman in a hundred will dissent.

But what shall we say of the doctor who does examine his patient, finds an eroded, thickened and easily bleeding cervix, and who treats that patient locally for months while he sees the growth increasing and the patient's condition getting progressively worse? Such occurrences are not a rarity. If the growth is not in the cervix, but in the endometrium, there is more excuse for his delay; even then he is not doing his whole duty by his patient.

What constitutes a thorough examination? Certainly, if a digital examination finds no cause for the bleeding, the endometrium must be investigated. Therefore, if the cause of the bleeding is not found in the cervix, and is not due to some other growth like a fibroid, the physician's duty plainly is to curet and submit the scrapings to careful microscopical examination by a competent pathologist. Every general practitioner is capable, or should be, of doing this, but if he feels that he does not desire to do it, he should at once refer the patient to one who can and will do it properly. We have known of such a physician who curets a patient in his office without an anesthetic, hoping thereby to ascertain the true condition. This is an improper procedure and one calculated to lead to failure; there is only one way to do it properly and successfully and that is under anesthesia and not in the office. If she has not a carcinoma or a fibroid, curetment will probably cure her.

Be it far from me to find too much fault with the general practitioner who is usually intelligent and wide awake to the best interests of his patient. I am only speaking of the small minority who do such things or neglect to do anything, wishing to show them the error of their ways. There is also a need for a crusade of popular instruction of our women and the medical profession alone can do this. The laity is alive to the necessity of early operation for acute appendicitis; the laity is alive also to the necessity of early operation for breast tumors which are located where they can see and feel them. But because they cannot see or feel the malignant growth of the uterus, and because they are so familiar with genital bleeding, they allow it to grow unheeded. What we need to do is to teach women the dangers of delay when they have abnormal genital discharges of any kind, especially if they be offensive or consist of too free or too frequent discharges of blood.

This paper is too elementary for this presence and I ask your pardon for inflicting it upon you but we here, as everywhere in our professional work, must act to a certain extent as teachers to the great body of medical men whose lines of practice do not bring them into contact with so large a number of these cases as is our fortune, or more properly put, our misfortune. It is our duty to teach them and through them, our women. Can we do any more than to publish our papers and the discussion of them in the current medical journals? I have chosen this subject particularly with the hope that it will lead to a discussion of ways and means by which we may do something more promptly than by waiting for the slow evolutionary changes which time brings about. Is it not feasible to put this subject before some committee of the American Medical Association and through them secure the distribution by Boards of Health bulletins which can be placed in the hands of women generally? State and local boards of health are instructing the general public on other questions of sanitation and preventive medicine. Tuberculosis and other communicable diseases are on the list, but do we ever see anything about cancer, the scourge which is doing so much fatal work everywhere? Of course, nothing can be said of its prevention, but much can be said to instruct the people as to its prevalence and of its symptoms when it attacks the uterus.

The statistics of operations done for carcinoma of the uterus are much better from German clinics than in this country, not because they have more skilful operators but because the women are operated upon earlier, their women have been taught to consult the surgeon earlier when they have symptoms of malignant disease of the uterus. I think there is a belief among general practitioners in this country, that hysterectomy for carcinoma of the uterus is an unsuccessful operation in so far as it prevents recurrence. Such has been the case and will continue to be so long as women so suffering are not operated upon earlier than they have been in the past. Early radical operations do give good results, and they ought progressively to give better and better results. Hysterectomy for carcinoma of the body gives notably better results even in late cases than when the cervix is involved. Our women should not only be taught that early operation gives better results, but also that the severity of the operation and the mortality and the morbidity are decreased thereby.

64 Richmond Avenue.

CALCAREOUS DEGENERATION OF THE FIBROID UTERUS WITH THE PRESENTATION OF A SPECIMEN.[1]

BY

WALTER B. DORSETT, M. D.,
St. Louis.

(With one illustration.)

Very little has been written on this subject of late. The older writers produced some literature which is interesting only so far as the rarity is concerned. Aside from difficulties that may be encountered in doing vaginal hysterectomies, namely, the bisection of the large fibroid and the ligation or clamping of the broad ligaments, it is not of interest now unless by its presence symptoms demanding operative intervention are presented. Such was the case in the instance that demanded the operation I am about to report.

CLINICAL RECORD.

Mrs. O.; age, seventy-four; nativity, United States. Social condition, widowed; number of children, four. Number of miscarriages, none. Principal symptoms: severe pain in the back, dragging sensation in the pelvis, and interference with the function of the bladder and rectum. Rectal tenesmus at times was very severe. Menopause at the age of fifty-six; bowels constipated; vaginal secretions, none; urination, painful and intermittent; urine analysis, negative.

On bimanual examination the uterine body could be moved about with great ease and when pressure with the vaginal finger was removed, the mass would drop downward in the lower pelvis and the mass then became wedged in between the rectum and bladder, thus explaining the interference with the functions of the bladder and the rectum. On account of her advanced age and general enfeebled condition the operation was done with more dispatch than usual, chloroform and ether being the anesthetics used.

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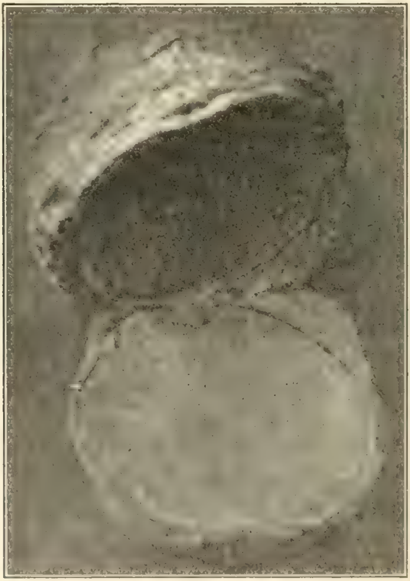
[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

On opening the abdomen the tumor was found lying loosely in the pelvis and unattached. On grasping the mass, the operator was reminded of the sensation usually imparted in the handling of uterine fibroids with a long pedicle. A supravaginal amputation was done and the abdomen closed within a few minutes. The patient made an uninterrupted recovery and left the hospital within eighteen days, well and relieved of her distressing symptoms.



Calcareous degeneration of fibroid uterus. (Sawn through center.)

The ligation of the renal artery of the rabbit by Litten and his subsequent discovery of deposition of calcium salts in the renal tubules, probably proves that the true etiology of calcareous deposits lies in a retrograde process due to deficiency of blood supply. It can then be readily seen that during the normal atrophic changes in the uterus due to decreased determination of blood toward the uterus, degenerative changes are apt to occur.

The following cases have been gleaned from medical literature at hand:

CALCAREOUS DEGENERATION OF FIBROID TUMORS.

John N. Upshur, of Richmond, Va., records in the AMER. JOUR. OBST., 1881, xiv, 108–111, a calcified fibroid of the uterus removed at autopsy. In the October number of the AMER. JOUR. OBST., 1879, Dr. J. T. Everett reports the successful removal of a tumor of this kind with a plate of the specimen removed and makes the statement that a review of medical literature since the days of Hippocrates shows but fifty-one cases and of these only thirty-three are well authenticated.

Dr. Gibb for Mr. J. T. Paul, November 15, 1859, reports in the proceedings of Path. Soc. Phila., 1860, a small bony tumor attached to the upper part of the uterus in a woman fifty years old who had never born children.

In the AMER. JOUR. OBST., 1891, xxiv, 595, G. M. Edebohls reports three myomata extensively calcified removed by enucleation from the uterus of a widow, aged sixty-three, who menstruated until fifty. Three years later she noticed a hard lump in the lower abdomen which slowly increased in size with pelvic pain and pressure symptoms.

J. Neill, *Am. J. M. Sc.*, Phila., 1867, in v. lviii, p. 438, reports the case of an unmarried woman fifty-eight years old, who had noticed for fifteen years a swelling in abdomen; had no trouble until last five months, at death the tumor was six inches in diameter. The tumor surface was irregular, covered with patches, nodules and cysts containing mostly fetid pus, uterus impacted in the pelvis and adherent to additional morbid growths originating in the broad ligaments. Contained several loculi or sacs containing greenish pus, walls were extremely hard and infiltrated with lime.

John Bostock, May 27, 1834, in *Med. Chir. Tr.*, Lond., 1835, tells of calculi discharged from the uterus during life. These were small bodies the size of a pin's head and larger, irregular and resembling decayed teeth, yellowish-white in color, hard, could not be cut. They were examined and found to contain phosphate of lime and a small quantity of the carbonate.

Dr. Robert Lee, in the same journal describes several cases and mentions one where a portion of the tibia of a chicken was found in the center. Hippocrates, Vesalius, Salius, Marcellus, Donatus and others tell of many wonderful cases of stones discharged from the uterus during life.

Charles P. Noble, Phila., in *J. Am. Ass.*, Chic., 1906, xlvii, 1881–1886, presents a paper entitled "A study of the degenerations and complications in 2,274 cases, also a study of 4,880 consecutive cases in their relation to carcinoma and sarcoma of the uterus." Including 337 cases of the writer, Martin 205, Noble 337, Cullingworth 100, Frederick 125, Watt-Keen (Hofmeiers) Clinic 300, Hunner 100, McDonald 280, Lauwers 200, Eastman 117, Webster 210, Martin, F. H. 200, total 2,274 cases. Under the heading of complications and degenerations in 2,274 cases relative to the tumor and uterus he states that Calcareous infiltration was present in thirty-nine cases or 1.7 per cent. calcification of the ovary was present in one case. In Noble's 337 cases calcareous infiltration was present in seven cases.

In the Cyclopedia of the Practice of Medicine, edited by D. H. Von Ziemssen, 1875, vol. x, Schroeder says: "Induration accompanied as it is by arrest of growth is followed by the deposit of the salts of lime. The presence of lime in irregular veins is first observed in the middle of the tumor, at a later period the deposit may be more considerable so it is difficult to saw through the tumor and maceration betrays the existence of something like coral formation; it is exceptional for the process to begin on the outer surface forming a shell. Calcareous degeneration occurs only in the subperitoneal and interstitial fibroids and is usually only met with in smaller interstitial tumors. Calcareous myomata which have been set free within the uterus have engaged the attention of physicians from earliest periods under the name of uterine stones. Hippocrates stated that a Thessalian maid sixty years old was seized with pains resembling those of labor after eating leeks and that a rough stone was extracted from the vagina. Salin tells of a woman delivered of a stone resembling a duck's egg in size and shape. Louis knew of eighteen cases of uterine stone. Velpeau, de Coze, Courty, Duncan, and Arnott tell of cases."

Saxinger reported a case in which the surgeon applied forceps and delivered a uterine stone the size of a child's head.

In Medico-Chirurgical Transactions xxiii, 1840, the story is told of a stone of fifty pounds which tore the rectum by its own weight on the occasion of a fall. In the museum of pathological anatomy at Erlangen is a large submucous fibroid measuring 13 inches by 8 1/2 inches in diameter which has become so calcareous throughout that a piece of the tumor which has been sawed out and macerated, simulates the structure of a coral. The specimen was furnished by Dr. Bohn, of Gunzenhausen, the fibroid weighed 24 1/2 pounds and was taken from the body of an unmarried woman sixty-one years old, who never bore children and who died of marasmus. She first noticed it when about thirty years old. It lay in a sacculated portion of the immensely distended abdominal walls, between the upper portions of the thighs inclining particularly to the left side.

Gusserow, in Cyclopedia of Obstetrics and Gynecology, 1887, vol. x, says: "Calcification is the last step in regressive metamorphosis; it forms a barrier to the further development of these tumors. Connective tissue impregnated with lime salts is an amorphous petrifaction and is composed of phosphates, carbonates and sulphates; they are frequently expelled, were formerly regarded as genuine calculi and were supposed to have originated like vesical calculi. We sometimes meet concretions in the vagina having some foreign body as a nucleus as, for example, bone, pessary and the like, thus resembling vesical calculi, but stones from the uterus are probably calcified fibromata. Avieta Candura discussed various conditions favorable to the formation of true calculi asserting that the employment of hard water was particularly noxious in this respect. Calcification usually affects the connective tissue of the tumor and, therefore, we often find concentric strata of lime salts traversing the tumor irregularly, but in the main following the course of the bundles of fibers. Rarely we find that the outermost layers of the tumor or connective tissue capsule alone are affected. When the connective tissue components of the tumor become calcified the interspersed muscular elements are prone to undergo degeneration as is often observed. As calcification is most frequent during the climacteric these processes are probably influenced to a great extent by the condition of the vessels of the uterine wall. The more the nutrient vessels of the tumor atrophy the greater the extent to which they are affected by atheromatous degeneration, and the more readily will calcification develop. Both small pedunculated as well as large interstitial growths are found calcified. Turner maintains that the constitution of the pedicle and the condition of its vessels are factors of prime importance in this respect, but adduces no evidence in support of his view. Large tumors may become calcified. In older literature the subject of calcification was sometimes held to be ossification, but the formation of bone is not met with in this connection."

G. Brown Miller, Chap. xv, in Boveé's Gynec., 1906 Edit., says "calcification of the tissues of fibroids leading to the formation of womb stones at times occurs, usually with increasing age. They are usually composed of the carbonates and phosphates of calcium and may be of considerable size."

Chapter xvii, 1907 Edit., Webster. "In rare cases a deposit of lime salts is found in fibroids especially in the pedunculated growths with narrow pedicles and in the detached tumors. Such transformed masses have long been known as womb stones. They are rare in interstitial growths and very uncommon in submucous polypoid tumors. They are most frequent in women of advanced age. The change is associated with imperfect blood supply to the tumor and is usually preceded by more or less fibrous transformation. Calcification may begin in the peripheral layers of a tumor, a complete shell being sometimes formed in this way, or it may begin in various points throughout the tumor."

Dudley, 1902 Edit., "Calcification occurs most frequently in subperitoneal tumors both large and small. The process may be general or local and may pertain to the fibrous septa or to the capsule. Exceptionally the entire tumor is displaced by lime salts and converted into a stone, the so-called womb stone.

Such stones sometimes take a high polish. The whole arrangement of the fibrous septa and capsule will then appear reproduced in the lime salts and will identify the tumor. More commonly the spaces between the septa do not calcify but disappear by some other degenerative process. This gives the calcified part a porous wormeaten appearance or coral-like formation. When calcification is chiefly or wholly in the fibrous capsule the tumor is covered by a thin hard crust which closely resembles the fetal skull." The writer cites a case where in removing a tumor from the corpus uteri it felt so much like a fetal head through the peritoneal and subperitoneal structures, that he almost abandoned the operation.

Ellice McDonald, M. D., *J. Am. Ass.*, 1904, xlii, 1344 (May 21), and *Albany M. Ann.*, 1904, xxv, 515–532. Complications and degenerations of uterine fibromyomata. A pathological and statistical study of 280 cases. In 788 cases, calcification was present in eleven cases. In 280 cases of fibromyomata there were hyaline and calcareous degeneration in eight cases; calcareous degeneration in fourteen cases; calcareous, necrotic, and hemorrhagic degeneration in two cases. Twenty-three examples of calcareous degeneration existed in old women, one being below fifty; they varied in consistence from those of the womb-stone type, ten centimeters across, to those with discrete moderate calcareous deposits.

Noble, *J. Am. Ass.*, 1904, xlii, 1350, under an article relating to complication and degeneration of fibroid tumors completed to January 31, 1904, or 278 cases, calcareous degeneration was present in six cases.

Under the same head is an article by Dr. Mary Scharlieb and it also appears in *J. Obst. and Gynec.*, British Empire, 1902, vol. i, page 323. In 100 consecutive cases calcareous degeneration was present two times.

Dr. J. M. Withrow, *Cincin. Lancet-Clinic*, 1904, page 35, reports a case, widow, age fifty, one child. About eighteen years previous she thought that she was pregnant, no menstruation for three months, abdomen enlarged rapidly for seven months. The tumor was loose and soft. She took electrical treatment and under this the uterus decreased in size, and menstruation appeared regularly. Thirteen years ago she had a miscarriage at four months, also another eight months later at six months, twins. About twelve years ago a hemorrhage from the vagina came on which continued until the present time; at the time that the hemorrhages appeared she noticed the tumor begin to increase in size. Pressure symptoms appeared affecting the rectum and bladder, legs felt tired and heavy. At operation the tumor was removed with great difficulty. It was stony hard; was sawed and proved to be a hard shell 1/4 inch thick; inside was semisolid, pulpy material.

U. S. Thorne, in Calif. State J. M. San. Fran., 1905, iii, 332, reports a case. Mrs. S., age thirty-two, married. Fibromyoma of uterine body and a number of small subperitoneal growths, one attached by a slender pedicle was necrotic. An oblong tumor of stony hardness was found attached to the pubic arch and forming part of the anterior bladder wall. It was examined by Professor Ophuls, of Lane Hospital, and found to be a calcareous muscular tumor the size of a hen's egg, it containing some involuntary muscle but was mostly dense fibrous tissue. It contained large areas of necrotic and irregular calcification. One of the calcified areas was transformed into bone tissue.

26 LINMAR BUILDING.

DISCUSSION.

DR. J. HENRY CARSTENS, of Detroit, stated that some thirty-five years ago a woman came to the dispensary with fibroid tumors of the uterus. In those days these tumors were not removed as frequently as they were to-day, and so nothing was done. Five years ago this same woman returned and she had a tumor which was almost identical with the one described by Dr. Dorsett. In fact, she had three tumors which were packed in the pelvis, causing obstruction of the bowels and bladder. He operated, removing the tumors. One tumor was about six inches long and four inches in diameter. These tumors were so hard and so solid that he could not cut them open with a knife, but had to split them with a hatchet to show the calcareous deposits. The point he wished to make was this, that no matter how long these cases were allowed to go without operation, sooner or later the tumors would undergo calcareous or malignant degeneration, and so on general principles all fibroid tumors ought to be removed.

DR. HUGO O. PANTZER, of Indianapolis, reported a case which was very similar to the one related by Dr. Dorsett.

NEPHROCOLOPTOSIS.[1]

BY

HOWARD W. LONGYEAR,

Detroit, Mich.

(With twenty illustrations.)

IN presenting this subject to the Association for the fourth time, I offer no apology, as the nephrocolic ligament having been born here, it is no more than natural and right that the child should return to its home from time to time, to report development and the story of its experiences, and possibly subject itself to needed advice and discipline. In my opinion, this return should be repeated until such time as its growth shall have become adequate to give promise of its perfect maturity.

I believe that in the nephrocolic ligament I have discovered the principal positive etiologic factor in nephroptosis. Believing that a nephroptosis, because of the action of this ligament, must always be secondary to, and the result of, a coloptosis (except when due to trauma), and consequently should not be considered separately, but of necessity with the prolapsed colon, explains my reason for the etiologic basis on which the subject is treated.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1908.

My contention regarding this action of the nephrocolic ligament gives a *raison d'être* for, and assists materially in proving the truth of the observation of Glenard—namely, "Enteroptosis without nephroptosis, but never nephroptosis without enteroptosis." This fact being accepted, the consideration of the subject of displaced kidney by itself, ignoring its cause and unavoidable accompaniment, in the displaced colon, would be a serious pathologic error and an omission of a full statement of fact, which would tend to lead to the unsatisfactory therapeutic results that have usually attended the treatment of cases of "nephroptosis" in the past.

The use of the terms "splanchnoptosis" and "enteroptosis," while describing a condition which may exist in exceptional cases, gives an erroneous idea of the pathology when applied to all cases of nephroptosis, and tend to lead into a maze of uncertainty and indefiniteness regarding both etiology and treatment.

Gastroptosis may be present with a nephroptosis, but not necessarily so, as is the case with a coloptosis, and when so present is almost inevitably a sequel to the nephrocoloptosis and one of the later developments of the pathology.

Hepatoptosis has no anatomic connection to be influenced by a nephrocoloptosis, and may occur independently of any of the other conditions. To get at a working basis for treatment it is true that all of these conditions and their relations to each other must be considered, but a concentration of thought upon the *beginning* of the involvement of the pathology is necessary to such an end, and it is upon this point that my endeavors are especially focused.

Still more misleading is it to look into the pathology no farther than the loose kidney. I believe that because of the commonly accepted and erroneous idea of considering the displaced kidney by itself the full pathological situation is misunderstood as well as the true significance and value of the symptomatology. It is quite commonly asserted by a number of authors that this little body when movable can, by the pressure of its weight, cause a variety of serious disorders, such as a kink in the colon by dragging it down; uterine displacements by the right kidney falling upon the organ; appendicitis by its weight interfering with the circulation of the organ; ovaritis; salpingitis; menorrhagia; metrorrhagia; hematocele; cystitis, and the like. When one considers that the weight of the kidney is but from four to six ounces, this all seems absurd, and when the fixation of it by the old methods—even when anatomically successful—so often not only failed to relieve the numerous manifestations attributed to it, but made them worse, it is no wonder that many physicians have become skeptical on the whole subject, and advise their patients to rather "bear the ills they have, than fly to those they know not of."

Patients are often told that the displaced kidney is of little importance, and that all that is necessary is for them to get fat and they will be all right. That is quite a safe prognosis, as these patients, usually, cannot get fat, but, on the contrary, continue to loose flesh, regardless of wisely-directed dietetic regimen, change of climate, tonics, etc. These are the patients that may be temporarily benefited by the Weir-Mitchell treatment of forced rest and feeding. They get up feeling much improved and think they are cured, but the erect position soon begins to cause a return of the irritation of the digestive organs, and consequent interference with nutrition, and the fat fades away and the old drag of colon on kidney and duodenum begins again. The rest treatment is not to be decried in these cases, but an operation should precede it, when the rest and feeding will assist materially in making the cure permanent.

I believe that a more general use of the *x*-ray, a more thorough palpation technic, and a due appreciation of their symptomatology will result in a needed improvement in the early diagnosis of these cases and consequently in the treatment of less of them for neurasthenia, intestinal indigestion, chronic appendicitis, cholelithiasis, cholecystitis, gastric dyspepsia, etc., and the use of a practical therapeusis based on the existing pathology—the *cause*, and not the *effect*—will then receive attention. No one can foretell the stage of a nephroptosis in which tortion of the pedicle may occur and an attack of Dietl's crises be precipitated. Without fixation by surgical means all cases are liable to the accident at any time. The attacks are not only severe and painful at the time, but, especially when long-continued, sequelæ of a serious nature are liable to eventuate.

Diagnosis of these displacements has not been taught to students in any practical way in the past, and of recent years it is but superficially done. The use of posture, palpation and the x-ray, in abdominal diseases, should be as thoroughly taught clinically as the physical diagnosis of diseases of the chest, which receives so much attention. Very few general practitioners know how to examine a patient for nephroptosis, so they do not recognize them, and then they wonder where the other fellow finds so many!

I recently operated on a case of extreme nephroptosis suffering from severe neurasthenia and malnutrition who had spent the last year in a fruitless search for health, trying sanitariums, osteopathic and other kinds of treatment, and had been examined by a number of reputable physicians, but only one—a neurologist—told her she had a floating kidney, and he only barely mentioned it, and remarked that it might trouble her some time! She said she had had many elaborate examinations of her chest, blood-tests galore, tuberculine tests, urine, sputum, etc., but no one even suspected the kidney and colon. She had been treated by them all for neurasthenia and intestinal indigestion. The foregoing is only one of many, but a very common picture, and it should not be so.

The diagnostic *obsessive apathy* that exists among the rank and file of the profession regarding the pathology in question is almost beyond belief or explanation. I believe the tendency to neglect this very serious pathologic condition is simply a bit of everyday human nature—a natural desire not to find things which are not of a definitely understood character and which cannot be remedied at all satisfactorily when found! What I hope to be able to accomplish is to assist in remedying this unsatisfactory state of affairs.

The prevalence of nephrocoloptosis is widespread and not wholly confined to any class, nationality, age, or sex. The floating kidney is found among the Bedouin women who live a nomadic life close to nature, where the developmental restraints of civilization and the corset play no part, as well as among the women of the most civilized countries, where dress, artificial ways of living, etc., are so much in evidence. The hard-working muscular factory girl and the delicate pampered society belle suffer equally. Many cases of nephroptosis have been noted in young children. I have seen a well-marked case in a girl of eight years of age.

A comprehensive understanding of the subject should lead to more thorough diagnostic effort directed to the kidney and colon than is usually displayed in the public institutions conducted for the treatment of those suffering from nervous and mental disorders. I have been of the opinion for a long time that our asylums and sanitariums have many chronic invalids whose mental recuperation could be given a start by the discovery and treatment of this condition. Many may also be saved from the asylum by the early recognition of the condition, as the long-continued malnutrition, intestinal irritation and toxemia, neurasthenia, etc., caused by the displacement, are so frequently the chief factors in the commencement of the mental break-down. The young woman who has a sudden nervous break-down, preceded for some time by indigestion, flatulence, headaches, insomnia, progressive emaciation, anaemia, etc., may be suffering from nephrocoloptosis and not to be one of those common cases where the easy diagnosis of "just nerves" is made.

The perfect construction of a well-designed machine requires that it shall be so made as to perform its work properly, and at the same time to continuously do its work for a reasonable period of time without breaking down or becoming out of order. That these purposes may be fulfilled, the first requisite that the designer insists on is that the materials used shall be of the quality best adapted to the uses of the various parts of the mechanism. An imperfectly tempered spring, die, or cam, results in imperfect work of the machine, if not in utter failure.

The human body—the most perfectly designed of all machines—must be constructed under the same specific requirements to enable it to perform its given work in a perfect manner, that its various functions shall work in harmony, and the purely mechanical parts operate without friction or failure, and not break or give way when subject to the normal strains of the working machine But right there, in the specification, comes the unsurmountable difficulty. The great Master Mechanic who designed this machine made the specifications perfect and plain to understand, but they are not always lived up to in the construction, and the results are, naturally, variable—one will succumb to the first strain almost as soon as finished—some vital part in such an instance, inheriting the tissue too fragile to do its part in the work of life. Defective construction in others may be shown in functional disorders leading to incomplete metabolism, gouty diathesis, tubercular tendencies, etc., or the lack of structural integrity may be marked in the purely mechan ical tissues—those which have to do with the binding together of different parts—the sustaining tissues—aponeurosis, fascia, tendon and muscle. The tendency to hernia, uterine displacements, lateral curvature of the spine, prolapse of the internal organs of the body, etc., may be transmitted by heredity as well as a crooked nose, imperfect teeth or other improperly constructed anatomy. A man says he has a hernia caused by a strain, whereas the strain was but a contributing incident while the real, the fundamental cause, of his rupture existed before he was born, even at the inception of his existence concealed in the germinated ovum. Finely drawn theories and elaborate arguments are not necessary to substantiate this position as clinical evidence in its favor is abundant.

On the other hand, it does not seem reasonable that the small weight of the kidney alone is sufficient to cause its displacement, even when loosely secured, and so we must look to the secondary or contributing causes for the link to complete the causative chain. To prove it when found it must be always present with the nephroptosis, and its action must be positive—*mechanically* positive. I contend that in coloptosis and the action of the nephrocolic ligament these conditions are fulfilled. This conclusion is substantiated by the evidence of my radiographic investigations, which show coloptosis present in *all* of a large number of cases of nephroptosis examined.

That the kidney is influenced by the bowel, and not the bowel by the kidney is proved by the fact, as stated, that all the cases of prolapsed kidney had also prolapsed bowel, while a number of radiographs showed prolapsed bowel with normally placed kidney (endorsement of Glénard's theory). The presence and action of the nephrocolic ligament makes it the most important factor in connection with the secondary or contributary causes, as by it the prolapsing colon pulls the kidney out of place.

The factors necessary for the occurrence of nephrocoloptosis, I believe to be four in number, namely: (1) Weak hepato-colic ligament; (2) prolapse of cecum and ascending colon; (3) loose attachment of kidney at its hilum and to Gerota's capsule; (4) strong and short nephrocolic ligament.

Without this combination the kidney will not be displaced. If the kidney is bound strongly to the back by the tissues around the hilum and blood vessels, and well adherent to Gerota's capsule (as usually found in postmortem), it should not only be impossible to dislodge it by such traction, but, with a short nephrocolic ligament, this mechanical arrangement should assist in *preventing* a coloptosis, and I believe this to be the normal mechanical action of these parts.

Reference to the radiographs of cases will show that the laxity of the peritoneal attachment of the colon at the hepatic flexure is the key to the whole line of decensus. When this gives way the cecum and ascending colon drop, and the drag on the kidney through the nephrocolic ligament begins. Hence I believe the right kidney descends or not, according to the laxity of its supports and the degree of traction exerted on it through the nephrocolic ligament, by the dropping of the ascending colon and cecum, which is permitted by a lax hepato-colic ligament.

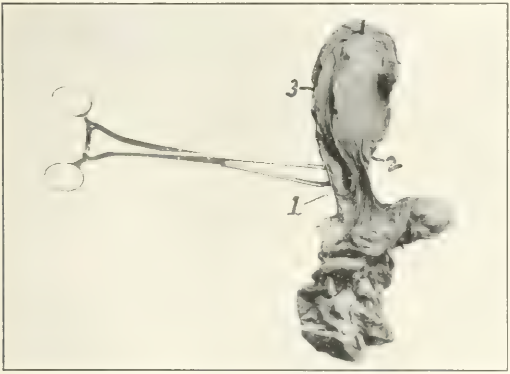


FIG. 1.—Right kidney, cecum, and ascending colon. Nephrocolic ligament: 1. Secured with forceps hook, as in the author's operation of nephrocolopexy. The dissection shows peritoneum covering kidney and bowel. 2. The edge turned back and Gerota's capsule uncovered. 3. Its margin is seen to pass down and merge into the ligament.

Coloptosis without nephroptosis I believe to be due to the presence of a long, loose nephrolic ligament, which allows the bowel to descend without making traction on the kidney. I have found this to be true in three operations done for the cure of constipation and colonic irritability, in cases of coloptosis without nephroptosis.

Much has been said of late, regarding the body shape as a cause of nephroptosis, and deductions made based on elaborate measurements and mathematic calculations, but I have found this theory to be of little practical use from either an etiologic or diagnostic standpoint. While a large number do have a conformation of body described, many do not fill the requirements at all, so that I have come to look upon the imperfectly developed body in these cases as due to the same primary cause as the ptoses which are so frequently found associated with it—namely, *hereditary laxity of restraining tissues.* Thus, the body shape is in no sense a cause, but simply a concomitant condition.

A thorough consideration of the symptomatology and diagnosis would alone occupy more than the time at my disposal, therefore, the salient points only under these heads will be touched on, and most profitably in connection with the radiographic reports of cases. I cannot be too emphatic, however, in emphasizing the value of early diagnosis, which should not be difficult if the meaning of the symptoms produced by the condition is understood. All obscure cases of neurasthenia, malnutrition, derangement of the colonic, gastric, or hepatic functions, etc., should be carefully examined for displacement of the kidney and bowel—or that of the colon alone, which, while the most difficult of diagnosis, will occasionally be found to be at the bottom of the trouble.

TREATMENT.

While much may be said regarding the nonsurgical treatment, especially on the subject of prophylaxis—the beginning of observation and treatment of cases of immature development in the young being of the utmost importance—also treatment by rest and forced feeding, massage, mechanical supports, etc., could be profitably considered, but the time will not permit, so I shall simply map out my general plan of treatment, and give a few illustrative cases, showing *x*-ray findings, etc.

I consider all cases of nephroptosis operative, because the condition of coloptosis which accompanies it is progressive, and nutrition is bound to be affected by it. Operation in suitable cases should precede all other treatment. No patient should be operated on who shows indications of acute irritation of the kidneys or in which the kidney to be operated is known or suspected to be pathologic in any way. The general plan of treatment is as follows:

The day prior to operation the bowels are completely evacuated by giving a double seidlitz powder every two hours, beginning early in the day, until five or six free watery evacuations have been induced. The early administration of the cathartic is necessary, so that the bowels may become quiescent by evening, thus insuring a quiet night and the resumption of normal conditions on the morning of operation.

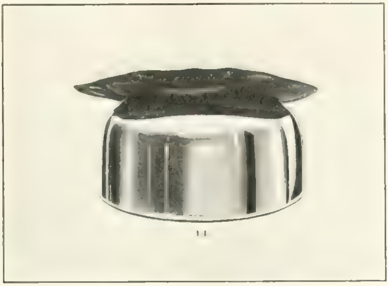
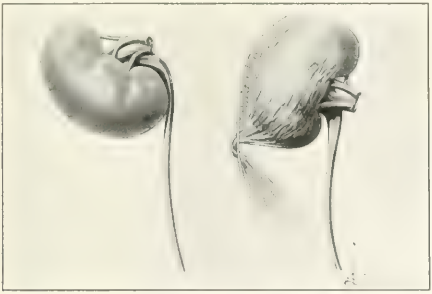


FIG. 2.—Longyear's kidney elevator.

The seat of operation is sterilized in the evening and covered with a sublimate pad, which is removed at the time of operation



A B

FIG. 3. A. Position of prolapsed kidney showing compression of ureter. B. Position of kidney when replaced by fixation of the nephrocolic ligament.

and the skin scrubbed with a gauze sponge and alcohol. The operation is performed in the usual position for all kidney operations, using the simple kidney elevator which I show you and which I have devised for this work. (Fig. 2.) It is composed of two parts—a metal round-topped dome having a round hole in the top through which is fitted a common ice cap, which is half-filled with warm water when in use. The appliance can be used on any table.

The details of the operation are practically as described in my previous paper published in our transactions for 1906, so I will not go into the technic at this time, except to say that the success of the operation depends largely on the ability of the operator to secure the entire nephrocolic ligament well below the lower pole of the kidney and attach it in such a way that it will remain secure and hold up the kidney and immobilize the ascending colon and cecum. (Fig. 3.)

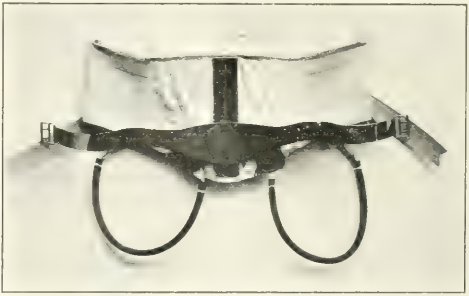


Fig. 4.—Longyear's abdominal supporter.

The wound is dressed in the usual manner, and then a large thick pad, filling the entire abdominal space below the navel, is firmly applied with adhesive plaster and a binder, which is kept in place during the time the patient is in bed. The patient is kept in bed for eighteen days, lying on the back or right side for operation on the right kidney, or the back only for double nephrocolopexy.

On arising, the previously fitted abdominal truss-band, which I show you, is applied. (Fig. 4.)

The truss attachment is formed of thin spring brass and is cut out and accurately fashioned to each patient by means of a previously made pattern of sheet lead, which permits of accurate adjustment to the peculiarities of conformation of each individual. A pad is attached to the under surface of the band, above the pubis, and just beneath the central portion of the truss. This band is to be worn until the patient shall have gained sufficient intraabdominal fat to sustain the transverse colon, and thus render the use of the band unnecessary. I consider the postoperative band a necessity, because the colon in all of these cases has become dilated and elongated by long-continued distention and needs support of some kind until its future quiescence shall result in a possible contraction for the intraabdominal fat-pad shall support it.

A most important part of the postoperative treatment is that relative to the colonic function. As the use of cathartics tends to continue the long-standing condition of irritability of the colon, which is pathognomonic in these cases, their use is strictly prohibited unless absolutely necessary. Instead of cathartics a plan of *lubrication* is instituted, and for this purpose "petrolatum oil" is used, giving a tablespoonful afternoons and bedtime. This being a paraffin and not a fat, it is not saponified or changed in the alimentary canal, but passes through unaltered, and so acts in a mechanical way to lubricate and smooth out the angulated and irritable bowel. The patient is directed to assist the unloading of the lower bowel by a low enema of normal salt solution every evening, if no movement has been had during the day. The bowels soon act regularly without the enema and then the oil is gradually diminished as the bowels become normal in their action, as they soon do, almost invariably after this operation.

The radiographs of the reports of cases which follow are selected from a large number as illustrative of certain points in pathology. They were taken for me by Dr. P. M. Hickey, of Detroit. Quite a number of our earlier efforts were failures, but of late improved appliances, taking the radiograph with the subject in the standing position, and more definite knowledge as to the use of the bismuth necessary to produce the shadow, have all combined to give better results. It is for this reason that the most of the radiographs which I show are of recent date. They show diagnostic possibilities in this line of work which should be used more generally than it is. To better bring out the salient points for reproduction of the photographic prints, the important points have been outlined.

The patient is given one ounce of C. P. subnitrate of bismuth suspended in a pint of milk—or still better, a pint of kumiss. A radiograph is taken of the stomach, when so desired, immediately afterward, and one of the colon in from twelve to twenty hours thereafter. If the bowels have been loose, or a cathartic has been previously given, a much shorter time should be observed than in cases having constipation, or normal colonic activity. Radiographs thus taken give a good idea of the position of the stomach, cecum and transverse colon, which is all that is desired in this class of cases. The bismuth should be used by enema to ray the descending colon, sigmoid, and rectum.

NOTES ON RADIOGRAPH CASES.

(Examination of patients for nephroptosis made in the dorsal decubitus, or lateral decubitus, with flexed thighs and knees, and deep inspiration used to dislodge the kidney.)

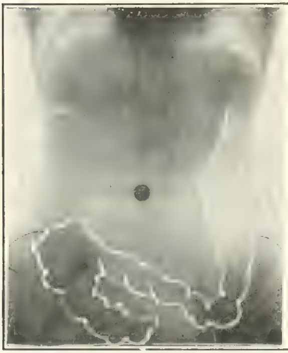


FIG. 5.—Shows very low point reached by cecum and apparently complete relaxation of the hepatocolic ligament.

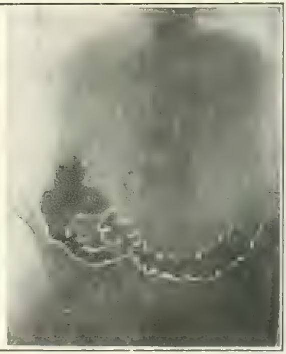


FIG. 6.—Shows result of moderate relaxation of the hepatocolic ligament.

Dietl's Crises.

1. OPERATIVE CASE XV. Female, single, forty-two years old. Attack of Dietl's crises three weeks before examination. Swelling and tenderness in right side, also pain and tenderness in right inguinal region. (Fig. 5.)

Operation April 3, 1907. Harper Hospital. Nephrocolopexy and abdominal section, with myomectomy of three small tumors, and appendectomy. Appendix found adherent to abdominal wall near the internal ring.

May 3, 1909. Kidney in normal position. No pain in that region. Nutrition much improved and has gained in flesh. Still wears the abdominal band.

Extreme Neurasthenia.

2. Operative Case XXXIV.—Female, forty-two years old, married, two children. Seeks relief for neurasthenia; constant headache; progressive emaciation; almost constant pain in abdomen, back and thighs; and alternating diarrhea and constipation. Is a chronic invalid, and unable to stand or walk but for a few minutes at a time.

Examination showed right kidney entirely below the costal margin, with patient in the dorsal position, and without inspiratory effort, also a ruptured perineum of second degree, and endometritis. (Fig. 6.)

Operation, November 3, 1908, nephrocolopexy, perineorrhaphy and curettage, at St. Mary's Hospital. In bed five weeks.

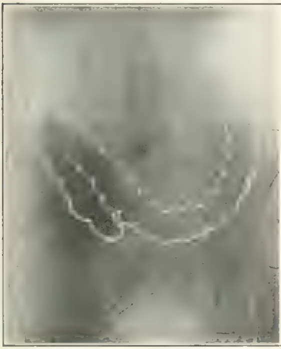


Fig. 7.—Shows complete prolapse of colon.

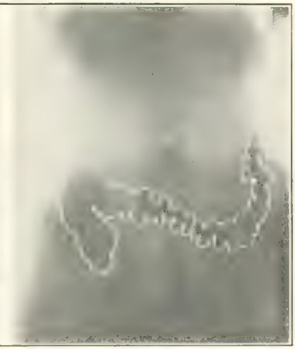


Fig. 8.—Shows result of moderate relaxation of the hepatocolic ligaments in a young patient.

July 3, 1909. Has gained thirteen pounds and feels better and stronger in every way. Still has some abdominal tenderness, and her nerve tone and endurance are returning slowly.

Bowels normal by the use of the petrolatum oil, once daily.

Bilateral Nephrocoloptosis.

3. Female, thirty-six years old, married, no children; factory hand. Seeks relief for pain in the left side, weakness and general emaciation. Is very nervous and can work but about half the time—often has to leave work because of pain in side and exhaustion. Has large frame, broad chest and abdomen.

Examination showed right kidney entirely below the costal margin with patient on the left side, during deep inspiration;

and the left kidney partially below the ribs with patient on the right side. Vaginal examination was negative. (Fig. 7.)

Operation on both sides advised, and hospital arrangement made, but patient sought other advice, and died of pneumonia following an *abdominal section* three weeks later.

Right Nephrocoloptosis.

4. OPERATIVE CASE XXXIX.—Female, single, twenty-five years old. Seeks relief for neurasthenia, malnutrition, debility, headache, dizziness, nausea, flatulence, cramps in the abdomen, sleeplessness and dysmenorrhea. Never can sleep on the left side, as it causes palpitation of the heart. Bowels constipated and require constant attention.

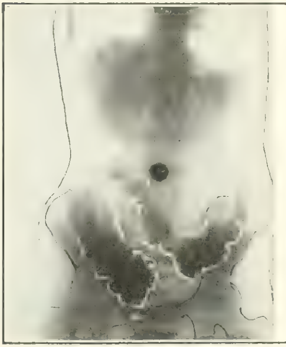


FIG. 9.—Enormously distended cecum. Appendix behind pubes, showing fallacy of McBurney's point as a diagnostic index in these cases.

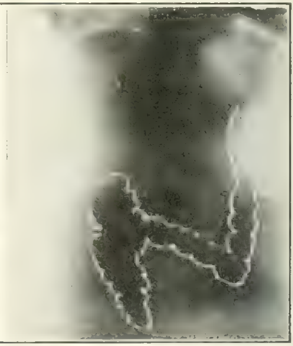


FIG. 10.—Showing very low position of right side of colon and large collection of gas at the splenic flexure where the transverse (now *ascending*) colon meets the descending colon, forming an acute angle

Examination shows right kidney entirely below costal margin. Left lateral position, with deep inspiration necessary to bring it down, when it remained so until replaced manually. (Fig. 8.)

Operation April 13, 1909, at Harper Hospital; nephrocolopexy and dilatation of cervix uteri.

Weight at operation, 94 pounds.

Weight June 7, 1909, 100 pounds.

Weight Sept. 1, 1909, 106 pounds, when she reported bowels in perfect condition; has discontinued the petrolatum oil.

Right Nephrocoloptosis Enormous Cecum.

5. Female, twenty-six years old, married, no children.

Seeks relief for excessive nervousness, emaciation, headaches, nausea, frequent attacks of itching all over the body, constipated bowels and genera debility. Can walk but little, and spends much of her time lying down. (Fig. 9.)

Examination in the left lateral position, on deep inspiration right kidney drops down to umbilicus. Operation recommended but deferred. Is now under the care of a gastroenterologist; wears an abdominal support; reports she is not much, if any, better. Note the enormously distended cecum.

Right Nephrocoloptosis Partial Occlusion at Splenic Flexure.

6. Female, thirty-seven years old, married, four children. Seeks relief for burning sensation over entire abdomen, quite constant pain in left side above the hip, dryness of the mouth, and alternating diarrhea and constipation. (Fig. 10.)

Examination in left lateral position, deep inspiration brings right kidney entirely below the costal margin. Notable for the large collection of gas at the splenic flexure, where it is apparently held by the angulation, and is the apparent cause of the pain in this side.

Operation advised.

Typical Case Showing Extreme Neurasthenia.

7. OPERATIVE CASE XXXVIII.—Female, forty-two years old, married eighteen years, one child sixteen years old, menstrual history normal.

Seeks relief for neurasthenia, general debility, malnutrition, dyspepsia, loss of memory, etc. Thinks injury is a railroad accident many years ago caused a shock to the nervous system, and that the present illness is due to it. Has lost thirty pounds in five years. Spends most of her time lying down; constipation very troublesome, requiring daily medication or enema. Mentality much impaired, being unable to carry on a connected conversation. Has no hallucinations. Sleeps little and never on the left side. Frequent griping pain in bowels and mucus in stools. Most pain in left side of abdomen.

Has been to sanitariums and health resorts for years with no benefit, and has consulted various kinds of specialists, from the neurologist to the osteopath, without benefit. They all advised change of scene and climate after unsuccessful periods of treatment. The diagnosis was usually "neurasthenia" and "intestinal indigestion."

Examination February 27, 1909. Facial expression drawn and tired looking; complexion muddy, almost to jaundice. Abdominal walls thick, flaccid and relaxed. Deep inspiration, dorsal position, right kidney can be felt down to the umbilicus, and does not return without manual assistance. With patient on the left side, and knees drawn up, the kidney is felt well in the median line. Left kidney not displaced. Some tenderness at McBurney's point cecum and ascending colon—not the appendix. (See Fig. 11 for position of appendix.)

Vaginal examination showed ruptured perineum of second degree, rectocele and uterine hyperplasia.

February 28. X-ray showed the cecum in the bottom of the pelvis as far as gravity could take it, and the transverse colon very low, causing sharp angulation at the splenic flexure. (Cause of pain in this side.)

Nephrocolopexy, perineorrhaphy and curettage recommended.

March 4, 1909. Operation at Harper Hospital. In bed three weeks.

April 1, discharged from Hospital, recovery ideal in every way. April 17. Bowels regular, without medication of any kind since operation; feels well and is gaining in flesh. Left for Atlantic City.

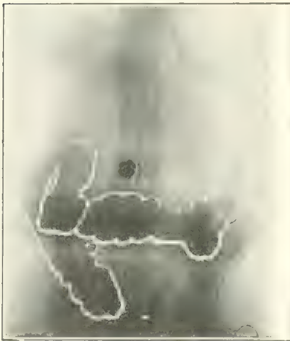


FIG. 11.—Showing great prolapse of cecum and moderate prolapse of transverse colon.

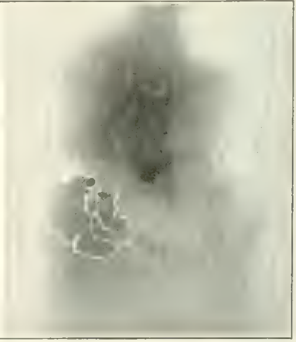


FIG. 12.—Showing result of moderate relaxation of hepatocolic ligament.

May 20, returned from Atlantic City; bowels regular and appetite good. Has no abdominal pain, and has gained eighteen pounds.

July 30, 1909. Bowels regular. Often walks two miles a day without fatigue. Sleeps well; has gained thirty-two pounds since operation. Mentality greatly improved, is sprightly and vivacious and enjoys life. On sending her to Dr. Hickey for another x-ray, he was especially struck with the greatly improved facial expression and mental tone. Radiograph a poor one. Dr. Hickey said I had made her too fat for a good one.

Right Nephrocoloptosis.

9. OPERATIVE CASE XL.—Female, thirty-seven years old, married, one child. Seeks relief for neurasthenia, approaching

melancholia in spells of depression; nervous irritability; dyspepsia; diarrhea; pain over whole abdomen, but especially in left side; emaciation; muddy complexion. Has passed the greater part of the past two years in sanitariums and health resorts, and has consulted various specialists. Was treated by them all for neurasthenia and intestinal indigestion and toxemia, and had all kinds of examinations of blood and secretions made.

Sleeps well, which is unusual in these cases.

Examination showed the right kidney entirely below the costal margin while in the dorsal position. (Fig. 12.)

Operation May 6, 1909, at Harper Hospital. September 29, 1909, reports great improvement in every way. Gained thirteen pounds; complexion is clear, bowel movements improving, rarely has diarrhea. Her family reports great improvement in the nervous irritability. Rarely has pain in the left side, and only occasional attacks of indigestion.

Typical Case Having Dietl's Crises.

10. OPERATIVE CASE XXXXI.—Female, twenty-six years old, married two months. Was always thin and dyspeptic, and bowels constipated. Gastroptosis diagnosticated a year before, and has worn an abdominal support for it. Has had two attacks of Dietl's crises—one three weeks before marriage and the other two weeks after that event. Had fever with both attacks, which were also attended with much swelling of the right kidney and surrounding structures, with albumin, casts and red blood cells in the urine, which conditions persisted for some time after the subsidence of the acute symptoms. (Fig. 13.)

Patient sent to St. Mary's Hospital and put to bed after the second attack, and kept under treatment, with absolute rest, for four weeks, when, all indication and symptoms of local irritation having subsided, and the urine cleared up, the operation of nephrocolopexy was performed on June 12, 1909. A retroverted uterus was restored by the Alexander operation at the same time. Recovery without incident. In bed four weeks. August 20, reported in good condition, no pain, bowels regular by using petrolatum oil, appetite good, and increasing in weight.

Coloptosis without Nephroptosis.

12. OPERATIVE CASE L.—Female, fifty-six years old, single. Seeks relief for insomnia, loss of flesh (forty pounds in three years) progressively increasing nervous irritability and depression, and fears loss of mind (and looks it). Face drawn and distressed; complexion muddy, bowels very constipated and movements attended with pain in the abdomen. Much pain in the left side over the hip—especially at night, when lying, and often has severe cramps of the muscles of the thigh of this side. (Figs. 14 and 15.)

Repeated examinations in various positions showed both kidneys to be normally placed and no other abdominal or pelvic trouble. Radiograph June 20, 1909, of stomach and June 21, of colon. July 10, 1909, applied my abdominal band and prescribed pretrolatum oil.

September 16, 1909. Reports some improvement in sleeping, and bowel movements. Still has abdominal pain, though less severe.

(Operation performed at Harper Hospital, October 15, 1909. Good recovery.)

14. OPERATIVE CASE XLVI.—Female, thirty-three years old; single; office girl. Had ulcer of the stomach at fourteen. Seeks relief for frequent attacks of pain in the abdomen, and a constant sensation of burning in the abdomen and sides. Walking increases symptoms, which are gradually becoming worse. Very thin and always constipated. (Fig. 16.)

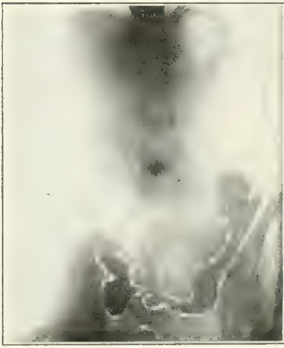


FIG. 13.—Showing general coloptosis and large fecal mass at splenic flexure.

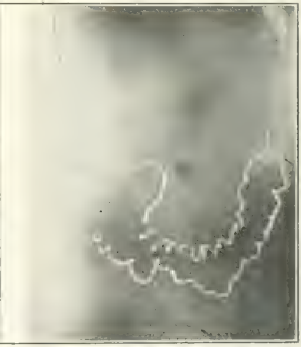


FIG. 14.—Showing general coloptosis.

Examination in dorsal position showed right kidney below the costal margin, and when on the left side was felt partly to left of umbilicus. Operation at Harper Hospital, September 14, 1909. Good recovery.

Nephro-gastro-coloptosis.

15. Female, twenty-nine years old, married, three children. Neurasthenia, emaciation, pain in abdomen, "bearing down," backache, dyspepsia, nausea. Has had several operations during the past seven years, besides having her children—appendectomy, abdominal section for adhesions, curettage, perineorrhaphy.

Examinations showed the right kidney down only when on the left side, with deep inspiration. (Figs. 17 and 18.)

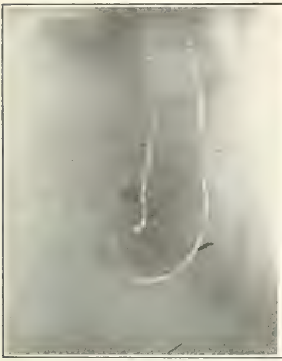


FIG. 15.—Gastroptosis

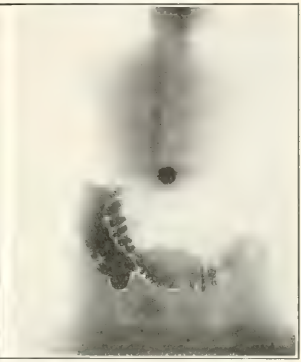


FIG. 16.—Showing complete prolapse of colon.

FIG. 18.—Showing result of good relaxation of hepatocolic ligament.

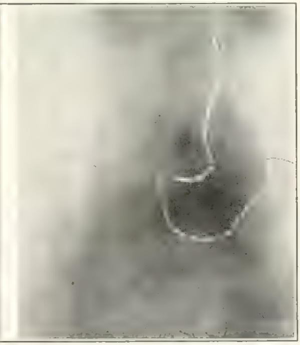


FIG. 17.—Showing quite extensive gastroptosis.

Abdominal band applied July 20, 1909, causes nausea, and does not use it.

Operation deferred.

Coloptosis without Nephroptosis.

(Radiographs before and after operation.)

17. OPERATIVE CASE XLI.—Female, forty-two years old, married, three children.

Seeks relief for constant pain in the left side, above the hip, and in the loin. Cannot walk or work because of it. Has had it for six months. Abdominal section one year before by myself for hematoma of both ovaries.

Examination showed both kidneys normally placed. Muscles in the left loin very rigid and abdomen on same side full and flat on percussion. Patient sent to the hospital, a cathartic given, and high enema used, and examination made under ether, which was negative in result, excepting that it showed complete relaxation and normal condition of the muscles of the loin.

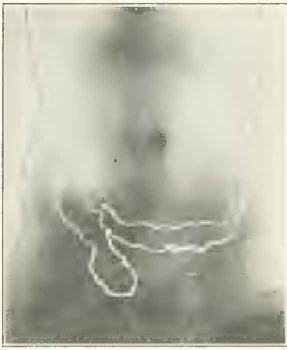


FIG. 19.—Showing result of great relaxation of hepatocolic ligament, and collection of gas at acute angle at splenic flexure, before operation.

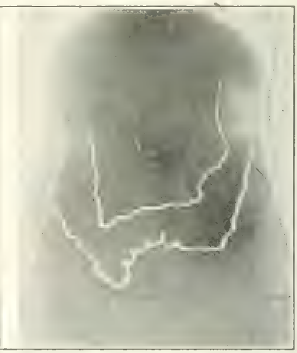


FIG. 20—Showing elevation of cecum and hepatic flexure and a tendency to correction of the sag to the left of the transverse colon. (See position of silver-wire suture.)

Patient was kept in bed under constant observation for a week without a change in the pain, which was nearly constant.

June 29, 1909, *x*-ray made showing large collection of gas at splenic flexure and complete ptosis of cecum. (FIG. 19.)

Operation at Harper Hospital July 1, 1909. Very long and loose nephrocolic ligament. No pain in the left side after the operation; after three weeks in bed and one week up, went home.

October 3, reports no pain and is improving in every way. (Fig. 20.)

Thus far I have operated on fifty-one cases by this method and have had no mortality, which is noteworthy, as 18 per cent.

of them had abdominal sections, and 66.6 per cent. minor operations in addition to the nephrocolopexy.

A complete report of my cases is in course of preparation, and will soon be ready for publication. A brief summary of results, noting only the salient points, is as follows:

SUMMARY OF CASES.

Number of operations since January 8, 1905, fifty-one.

RESULTS.

Position of kidney:

Perfect, twenty-nine; improved, eight; failure, one.

Nutrition as shown by body weight:

Increase from five pounds to twenty-five pounds within a year after operation, thirty-four. No increase, four.

Regulation of the movements of the bowels:

Normal, either without medication or by the use of the petrolatum oil, thirty.
Improved, six.
Not improved, two.

Nervous system:

Very much improved within one year, seven.
Much improved within one year, twenty-seven.
Not improved within one year, four.
(Older cases show most improvement.)

Endurance:

Very much improved within one year, fourteen.
Much improved within one year, fifteen.
Not improved within one year, nine.
(The older cases show greatest percentage of improvement in this respect.)

Dietl's crises:

Two cases, both completely cured.
Cases not reported because of inability to reach them, or too recently operated, thirteen.

The most noticeable immediate betterments are: improved nutrition, as shown by increase of body weight—which, in some cases, is very rapid—and relief from colonic catarrh, constipation and the general symptoms of colonic irritability.

Just what is accomplished by the fixation of the bowel that leads to the remarkable improvement in the action of the colon has been an interesting study to me. Until I had postoperative radiographs made, I attributed the improvements to the elevation of the cecum and ascending colon, but as the radiographs—even in my best cases of recovery—indicate too little change in this respect to be counted on as the only positive factor, I have come to the conclusion that the improvement is largely due to the *immobilization* of the gut, caused by the fixation, which acts as a substitute for the relaxed and deficient, hepatocolic ligament. The reverse peristalsis, alternating with the forward peristalsis, producing the *churning* action of this part of the colon, is probably facilitated by the fixation, as well as the passage of the contents of the bowel over the hepatic flexure. The benefit to nutrition I attribute to the removal of the traction on the duodenum as well as to the resumption of the normal action of the cecum. The neurasthenia disappears more slowly, but does so surely as the nutrition continues to improve.

Cases should be under careful observation for at least a year after operation, as the old, long-standing, bad habits of nerve, muscle and mucosa do not give way completely at once, so that assistance and guidance are often necessary till the natural functions have been entirely restored.

In cases previously attended by severe neurasthenia, great tenderness of the abdomen, gastric irritability, etc., much benefit has been derived by some of my patients from a course of postoperative sanitarium treatment, in which forced rest and feeding, freedom from care, abdominal fomentations, etc., were the principal restorative agencies.

In fact, the complex pathologic conditions presenting, in a great proportion of these cases—especially those of long standing—demand, for their welfare, the best they can obtain from the surgeon, the gastro-enterologist (or internest), and the institutionist. When this principle is generally acted on, and these specialists get together and work in harmony with these patients, each doing his very important share, and giving the best to be had in his field, and not jealously opposing each other, then will the greatest gain be made in their treatment and the enteroptic will cease to be the reproach of the profession that it has been for many years.

271 WOODWARD AVENUE.

RUPTURE OF THE UTERUS DURING LABOR.[1]

A STUDY BASED UPON THE CASES TREATED IN THE THREE DIVISIONS OF THE NEW YORK LYING-IN HOSPITAL.

BY
RALPH WALDO LOBENSTINE, M. D.,
New York.

(With seven illustrations.)

THE cases of rupture of the uterus that have come under my care, either directly or indirectly, have made such a profound impression upon me, because of the very high maternal and fetal mortality, carrying with it so much suffering and anguish—the greater part, or all of which, might be avoided—that I feel it will perhaps not be amiss if I attempt at this time to present for your consideration the essential features of this important subject.

We have had under our care at the Lying-in Hospital, in a series of 60,000 cases, forty-six cases of complete rupture of the uterus, twenty-nine of incomplete rupture, and three of rupture of the vaginal vault without actual laceration of the uterus. It is interesting in this connection to note that complete ruptures—as shown by our figures as well as by those of other observers—are of more frequent occurrence than the incomplete. This relation, however, must be due in a measure to the fact that doubtless many cases of the lesser grades of severity pass at times unrecognized.

A rupture of the uterus may occur at any time during the first and second stages, or even during the latter months of pregnancy.

The condition of "complete rupture" is found but seldom among the wealthy. It occurs far more often in multiparæ than in primiparæ. In the Lying-in Hospital series there were forty-four cases of complete rupture in the former and only five in the latter (this includes the three cases of rupture of the vaginal vault); while in the "incomplete type" there were eleven multiparæ and eighteen primiparæ.

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[1] Read by invitation at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21-23, 1909.

v. Winckel had fifteen multiparæ and two primiparæ.
Knoblauck reports seventy-five multiparæ and five primiparæ.
Kolaczek reports eighty-two multiparæ and two primiparæ.
Bandl reports thirty-five multiparæ and four primiparæ.
Trask reports 181 multiparæ and thirty-nine primiparæ.
(v. Winckel.)

The chief reasons for the greater frequency in multiparæ of complete rupture are these: 1. The general health of multiparæ among the very poor is not, as a rule, as good as among women who are pregnant for the first time. 2. In a considerable number of women who have born children the uterine musculature has been weakened by inflammation, by scars of former incomplete tears, or by operative scars.

GENERAL ETIOLOGY.

1. *Conditions Due to the Uterus.*
    - (a) Uterine scars due to Cesarean section (two of our cases); old incomplete lacerations of cervix or lower zone, etc.
    - (b) Prolonged dry labor.
    - (c) Tumors of the uterus.
    - (d) Fixation operations of uterus.
    - (e) Anomalies, as "uterus duplex" and "unicornis."
    - (f) Degenerations of the uterine musculature; Abnormal imbedding of chorionic villi.
    - (g) Congenital Hypoplasia of uterus.
    - (h) Congenital or acquired stenosis of cervix.

2. *Conditions due to the Child.*
    - (a) Congenital anomalies, as hydrocephalus and other monstrosities.

Ivanhoff reports four cases of hydrocephalus in 124 cases of rupture.

Keith reports sixteen cases of hydrocephalus in seventy-four cases of rupture.

Hohl reports five cases of hydrocephalus in seventy-seven cases of rupture.

Fred. Müller reports five cases of hydrocephalus in 108 cases of rupture.

Schüchard reports fourteen cases of hydrocephalus in seventy-three cases of rupture.

Kormann reports three cases of hydrocephalus in sixty-three cases of rupture.

Merz reports eighteen cases of hydrocephalus in 230 cases of rupture.

In our own series there has been but one case of hydrocephalus in the seventy-eight cases of rupture.

- (b) Abnormal presentations of the fetus, especially *transverse presentations.*

3. *Conditions Due to the Pelvis.*
    - (a) Pelvic contractions.
    - (b) New growths originating in any of the pelvic organs or in the pelvic girdle.

Pelvic contractions are directly responsible for a very large percentage of complete ruptures. Of the different varieties of pelvic deformities, the "generally contracted pelvis of moderate grade" is acknowledged as the one most frequently seen in these cases.

Bandl gives nineteen small pelves in thirty-two ruptures; Fritsch, 388 deformities in 500 ruptures; v. Winckel, eleven in seventeen; Merz, seventy in 230 ruptures. (v. Winckel.)

4. *Intrauterine manipulations*, as rapid manual or instrumental dilatation of the cervix, forceps, version, too rapid extraction of after-coming head, embryotomies, etc.

ETIOLOGICAL FACTORS IN OUR SERIES OF FORTY-SIX COMPLETE RUPTURES.

1. Spontaneous ruptures due to	
(a) Pelvic contraction,	21 cases
(b) Cesarean section scar,	2 cases
(c) Scar tissue after amputation of cervix,	1 case
(d) Transverse presentations,	3 cases
(e) Hydrocephalus,	1 case
2. Traumatic ruptures—	
High forceps,	3 cases
Internal podalic version,	5 cases
Accouchement forcé,	
for placenta previa centralis,	5 cases
for eclampsia,	1 case
Embryotomy,	1 case
3. Ruptures due both to version and transverse presentation,	3 cases
Total,	46 cases

PATHOLOGICAL ANATOMY.

Complete rupture of the uterus may be either spontaneous or traumatic. It may occur in any portion of the uterus, but is most frequently seen in the lower uterine zone. The laceration may be only large enough to admit the finger or it may allow the escape of the child into the peritoneal cavity. In the classification of the various ruptures we believe that two fundamental types may be recognized, namely: 1. the transverse; 2. the longitudinal or vertical. In the former, if in the anterior uterine wall, the bladder is frequently extensively injured, while in the longitudinal rupture—excepting in the simpler cases—the uterine vessels on the side of the tear are usually involved, accompanied by more or less extensive damage of the broad ligament.

These two fundamental types are but rarely well defined. The writer believes further, that within certain limits, the method of occurrence of the rupture, *i.e.*, whether it is due to intrauterine manipulation or whether spontaneous in origin, largely determines the "primary nature" of the laceration—the former giving rise to the "primarily vertical type," the latter to the "primarily transverse rupture" of the lower zone.

In our list of cases there were twenty-six that probably started as the vertical type and twenty as the transverse. Of the twenty-six cases of the vertical type, eighteen occurred in the left side and six only on the right (two were mesial). (One of this group had a tear on both sides.) Of the twenty cases of the transverse type, thirteen occurred on the anterior wall and seven on the posterior. (In one instance both anterior and posterior walls were partially involved.)

The majority of our cases showed more or less fusion of these two fundamental types, owing to the fact that practically all of the cases presented the picture of an excessive degree of trauma.

A pure fundal rupture was seen but three times (two of these Cesarian scars) in this group of cases.

According to Sauvage, in a series of thirty-six complete ruptures, longitudinal tears were found twenty-one times and transverse fifteen times. Wychgel and Sauvage, Fred. Müller, and others state that transverse tears of the posterior uterine walls are much less frequent than of the anterior.

MECHANISM OF SPONTANEOUS RUPTURE.

Normally, at the time of labor, with the development of uterine contractions, the uterus becomes differentiated into two definite zones or segments. The upper or fundal segment is the actively contracting portion of the uterus and is therefore the part that dilates the cervix and expels the child. The lower zone remains practically passive. These two segments are divided by what is called the "contraction ring." As labor progresses, the fundal zone increases in thickness and the contractions become more vigorous. The lower zone becomes thinner and thinner by a combination of circular and longitudinal stretching of its fibers. The contraction ring gradually assumes a higher level, and in the presence of a dystocia (whether due to a pelvic contraction, a large head, or other abnormality) actually becomes

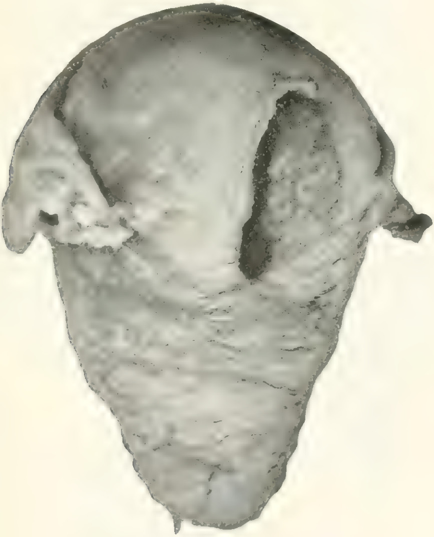

Fig. 1.—Vertical rupture in fundal zone.

of a pathological significance. The location of the "contraction ring" is seen and felt externally, while internally it develops into a well-marked ridge. As the process continues, the whole uterus becomes retracted, tetanically contracted, and the lower zone so thinned out—especially when the site of a chronic inflammation—that it finally is forced to yield to the unusual strain. Moreover, it has been shown by Bandl and Michaelis, Schröder, v. Winckel, and we ourselves have had abundant

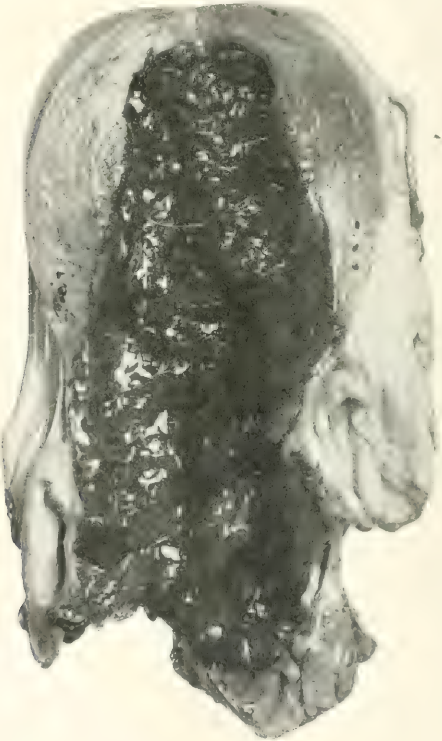

FIG. 2.—Vertical rupture through the entire length of the anterior uterine wall.

proof thereof, that the *imprisonment of the lower portion of the cervix, between the presenting part—especially the head—and the pelvic brim, will account very largely for the above phenomena, and will explain most of the spontaneous ruptures.*

Other observers, as Veit and more recently Schröder, believe, that the "lower fixation-point" lies in the connective tissue surrounding the cervix and upper vagina.

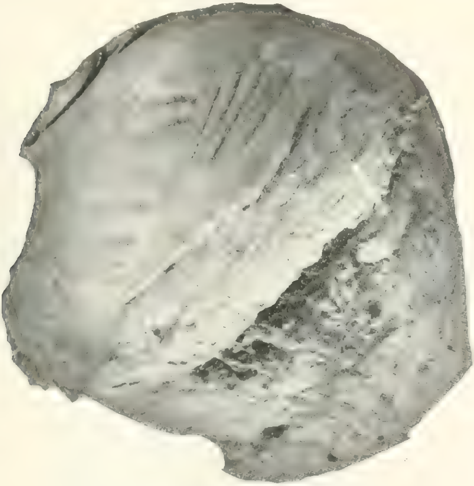

FIG. 3.—Vertical rupture through left lateral uterine wall, tearing away the entire anterior leaf of the left broad ligament.

In those cases in which the cervix does not become "imprisoned," but, on the contrary, is drawn up over the presenting part (and this is especially seen in transverse presentations), the vaginal vault is likewise gradually drawn up more and more and is ultimately put to such a strain that a rupture occurs. In the simpler lacerations there results merely a rupture into the peritoneal cavity without actually damaging the uterus proper, while in the severer cases a typical transverse rupture of that organ develops also.

Bandl, v. Winckel, Michaelis, etc., testify to the observation that the most frequent ruptures occur in multiparæ, in pelves of moderate contraction, and especially in justominor ones, for in these cases the presenting part—especially the head—exerts pressure more or less equally upon the entire circumference of the cervical ring, which, becoming edematous, is finally absolutely caught between head and pelvic brim. This occurs likewise in other types of pelves, but is less common.

We would note further that the ligaments of the uterus—especially the round and broad ligaments—owing to their natural development during pregnancy, act as real supports to the lower uterine zone when the latter becomes dangerously thinned out. Finally, we should not forget the great restraining and protective power which the anterior abdominal muscles exert upon the anterior wall of the uterus.

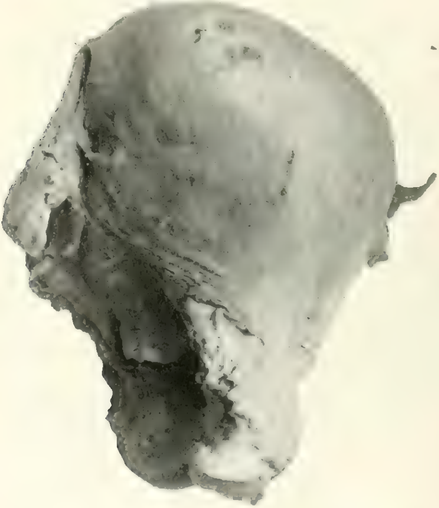

FIG. 4.—Vertical rupture through the right lateral uterine wall.

SYMPTOMS OF COMPLETE RUPTURE OF THE UTERUS.

1. *Premonitory.*—Prolonged and severe uterine contractions, increasing in intensity—the presenting part not making the

proper advance; a pulse increasing in frequency; the patient becoming more and more worn and haggard. The uterus becomes more and more tonically contracted and rotated on its long axis. A sharp line of demarcation can be observed between the upper and lower zones. The round ligaments become very prominent, especially the left, as the axial rotation is usually to the right.

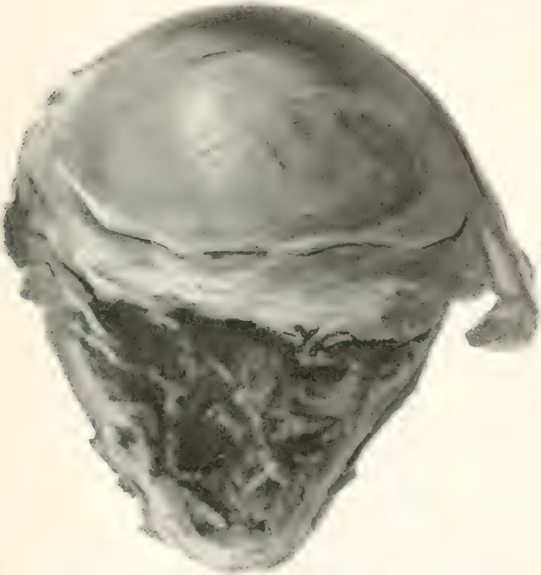

FIG. 5.—Transverse rupture at utero-vaginal junction with great destruction of tissue.

2. *Active Symptoms of Rupture.* As a rule, the patient, after presenting for some little time the above symptoms, suddenly, during a severe uterine contraction, cries out in great anguish, complaining of a sharp—often agonizing—pain in the uterus, and usually feels that something has given way in the abdomen. The latter soon becomes exceedingly tender. Immediately following these symptoms, all uterine contractions cease.

There may or may not be profuse external or internal hemorrhage.

There are cases, however, where the symptoms of actual rupture progress more slowly.

Vaginal examination shows a retraction of the presenting part (as a rule); a rupture in some portion of the uterus; the child, wholly or in part, free in the peritoneal cavity. Eversmann maintains that the fetus escapes into the abdominal cavity much less frequently than is generally believed. His figures are 7.2 to 16 per cent. of all cases. In our series this occurred in seven cases; *i.e.*, in 15 per cent.

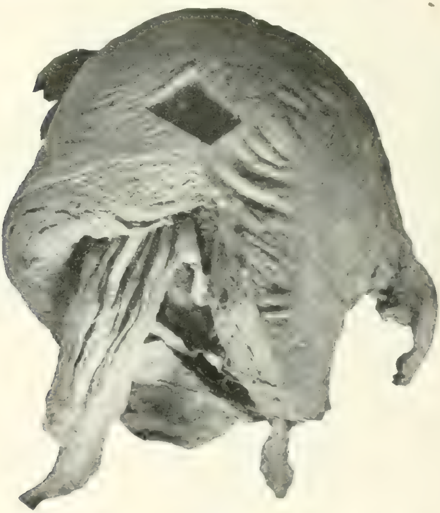

Fig. 6.—Irregular transverse rupture of the lower anterior zone (membrane still in place).

If the child is entirely outside the uterus, the latter may be felt either directly behind the symphysis or well over to one side of the false pelvis. Although some authors claim that in such cases the uterus is always firmly contracted, we do not believe this to be the case. It is, we believe, only the case in milder grades of trauma. In our cases, the uterus has, more often, been *large, flabby, and boggy.* Soon after the occurrence of the rupture, the patient develops symptoms of shock. The pulse becomes rapid and wiry; the face becomes pale and anxious and covered with sweat; the abdomen distended and tender. (There are, however, exceptions to the latter.) If there is profuse hemorrhage, there is chilliness, air hunger, etc. Death occurs frequently within a few hours either from shock or hemorrhage or from both—sometimes very suddenly. If the patient does not die within the first twenty four hours, she becomes gradually weaker, the face becomes more pinched and anxious, the abdomen more and more distended, the pulse weaker and rapid, the temperature subnormal or rising higher and higher. The urine is diminished in quantity and is often bloody. Vomiting is usually present. The chief cause of the "late deaths" is sepsis.

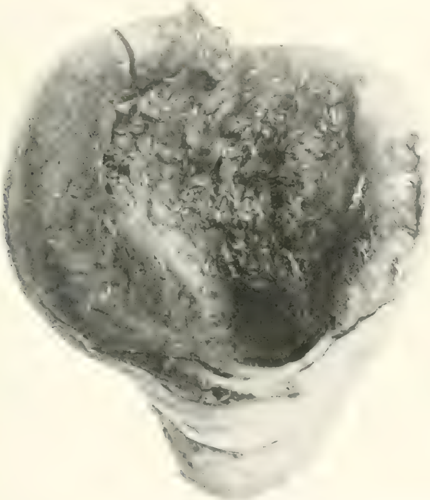

FIG. 7.—Rupture through the scar of a former Cesarean section, extending down to the undilated cervix

The above is the picture presented by the extreme cases of rupture. In the more favorable ones, either after operation or simply with tamponage, the symptoms gradually improve and the patient ultimately recovers.

In the cases of rupture after Cesarean section or in those rare cases that rupture early in labor, there may, practically, be no premonitory symptoms.

The following are brief abstracts of the histories of the forty-six cases of complete rupture in our series:

CASE I.—*Spontaneous Rupture.*—Mrs. Lena T., para-I; at term. Total duration of labor uncertain, membranes ruptured early; second stage six hours. When first seen by us, patient found to be in a condition of moderate shock. All uterine contraction had ceased. There was severe abdominal pain. The diagnosis of rupture of the uterus was made at once. The child was dead. An internal podalic version was performed (as being the quickest mode of delivery) and a craniotomy of the after-coming head. After the removal of the placenta, the uterus and laceration were packed with iodoform gauze; the amount of bleeding was moderate. The dystocia was due to a *simple flat pelvis.* The patient was then transferred to my service in the hospital and a hysterectomy performed. On opening the peritoneal cavity, only a moderate amount of blood was found therein. The uterus was large, soft, and boggy. The rupture was a large transverse one in the lower zone anteriorly at the level of the internal os, opening both the vagina and left broad ligament. The uterus was removed, leaving a small section of the cervix. All bleeding was checked; all raw surfaces covered with peritoneum. After the toilet of the peritoneal cavity, the abdominal wound was closed without drainage. The patient made a rapid recovery.

CASE II.—*Spontaneous Rupture.*—C. N. 7429. Mrs. F. L., age thirty-two, para-II; at term. Patient's membranes had been ruptured for five days; she had been in labor two days and in the second stage many hours, when she suddenly began to show symptoms of collapse. When first seen by us, there was vomiting and marked abdominal distress. Her temperature was 103° F. and the pulse 140. There was no fetal heart; there was a foul discharge from the uterus. A craniotomy was at once performed and an infusion given. The patient continued to bleed moderately and was in severe shock. A laparotomy was then performed by the writer. The peritoneal cavity contained but little blood, but the odor was very bad. The uterus was large and flabby. There was an extensive laceration in the anterior uterine wall at the vault of the vagina, extending transversely and involving the entire left broad ligament. A panhysterectomy was quickly performed, the peritoneal cavity cleansed with physiological salt solution and drained *per vaginam.* The abdominal wound was closed without drainage. The patient seemed to rally for a while, but died about six hours after the operation. Dystocia was due to flat (simple) pelvis.

CASE III.—*Spontaneous Rupture.*—C. N. 6689. Mrs. R. G., para-II; at term. Patient went into active labor two and one-half days before entering the hospital. About twelve hours before being brought to us, the pains suddenly ceased after several unusually severe ones, and the child seemed to the patient to escape from the uterus. There was moderate bleeding. On admission, she looked septic. There was no very great amount of shock; there was moderate oozing from the uterus. The abdomen was distended and tender; vaginal examination showed a generally contracted pelvis, with a true conjugate of 7 cm. The vaginal mucosa was badly lacerated. There was a large transverse uterine rupture posteriorly at the utero-vaginal junction. The hand passed freely into the general peritoneal cavity. The uterus was fairly well contracted; the child and placenta were free in the peritoneal cavity. A laparotomy was at once performed by the writer. The abdomen was found to emit a foul odor and to contain child, placenta, and blood-clots. After their removal, the uterus was removed by panhysterectomy. The broad ligaments were not badly torn, but were markedly edematous, so that ligaturing of the uterine vessels was difficult. The pelvis was drained with iodine gauze. After cleansing the peritoneal cavity, the abdominal wound was closed in three layers. The patient stood the operation fairly well, but we feared that she was too septic to live. At the end of twenty-four hours she had passed no urine. We feared occlusion of the ureters by our ligatures of the uterine vessels. Dr. Walter C. Klotz kindly catheterized the ureters for me. Both catheters were checked at about 3 cm. from the ureteral orifices. Thereupon I at once reopened the abdominal wound, found both ureters greatly distended down a short distance from the bladder. Two suspicious ligatures that were apparently compressing (although not surrounding) the ureters were cut, and at once the ureters collapsed, emptying themselves into the bladder. This accident occurred, I believe, because of the difficulty at the primary operation in making the ligatures hold in the edematous broad ligaments. The abdominal wound was rapidly closed. The patient passed thereafter a fair amount of urine, but died unexpectedly, about six hours later, of streptococcus septicemia.

CASE IV.—*Simple Flat Pelvis. Spontaneous Rupture.*—C. N. 6457. Mrs. S. G., para-V; at term. The patient had been in labor for twenty-four hours with the membranes ruptured from the start. After being in the second stage for about three hours, she suddenly had a very severe pain which caused her to feel as if "something had given way in her abdomen." There was a profuse hemorrhage; all uterine contractions ceased. The patient was at once delivered with forceps without much difficulty. The uterus and laceration (which existed) were packed with iodoform gauze and the patient sent to my service in the hospital at once. The packing controlled the hemorrhage largely. There was no intense shock. A laparotomy was performed. On opening the peritoneal cavity this was found to be full of blood and blood-clots. The laceration in the uterus extended upward through the cervix along the right lateral wall of the uterus nearly to the fundus. The anterior leaf of the right broad ligament was torn away. The bladder seemed intact, although a catheterized specimen of urine before operation showed some blood. A supravaginal hysterectomy was performed and a strip of iodoform gauze passed down through the remains of the cervix. The peritoneal cavity was washed out with salt solution and the abdominal wound closed in three layers, with catgut. The patient convalesced rapidly, but developed on the ninth day a vesicovaginal fistula, which was closed at a later date by another operator.

CASE V.—*Traumatic Rupture.*—C. N. 7976. Mrs. J. S., age thirty-four, para-VI; at term. Patient had a placenta previa centralis. When examined there was profuse bleeding with the cervix dilated to 6 cm. and soft. A rapid dilatation was performed, the hand passed through the placental tissue and an internal podalic version done. There was some difficulty in bringing the after-coming head through the rim of cervix that persisted. A living child of good size was obtained. After the delivery of the placenta, there was found to be a complete longitudinal tear of moderate extent through the anterior lower segment of the uterus, through which intestine could be felt. The opening was at once packed with iodoform gauze and the patient stimulated. There was no great amount of shock, and as the rent was moderate and apparently not bleeding, no laparotomy was done; convalescence proceeded satisfactorily.

CASE VI.—*Traumatic Rupture.*—C. N. 2383. F. M., age sixteen, para-I; at term. Second stage not known. Total duration of labor uncertain. Admitted in second stage with profuse hemorrhage. Membranes had ruptured prior to admission. Unsuccessful attempts had been made to deliver with high forceps. Cervix found to be torn through on both sides. On left side tear extended through vaginal vault into and through the broad ligament. Delivery accomplished with high forceps in hospital. Patient in profound shock after delivery; pulse 140. Operation deemed inadvisable. Tamponade of uterus and broad ligament. Intravenous infusion given. Condition very poor, but held out for five days and died on the sixth day—puerperal sepsis.

CASE VII.—*Traumatic Rupture.*—C. N. 2760. T. H., age thirty-three, para-IV; at term. Second stage unknown. Total duration of labor about forty-eight hours. Membranes ruptured twenty-six hours prior to admission. Transverse presentation—prolapse of arm and leg. Several attempts at podalic version by private physician. On admission general condition very poor, pulse feeble and rapid. Examination revealed left arm protruding through tear in uterus, which extended from below in front, vertically upward through the attachment of the left broad ligament, involving all the layers of the uterus. Bleeding profuse. A version and craniotomy on after-coming head were performed. Laceration packed with sterile gauze, followed by immediate removal of uterus. Death occurred shortly after operation.

Case VIII.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 2300. A. R., age thirty-seven, para-VII; at term. Duration of labor not known. Membranes ruptured during first stage. On admission, patient suffering from shock. Profuse bleeding; pulse 160. Version and extraction—still birth. Rupture of uterus found. Immediate hysterectomy was performed, but before peritoneum could be sutured the patient died.

Pathologist's report: Laceration in uterus four inches long on posterior surface transversely.

Case IX.—*Traumatic Rupture.*—C. N. 2252. K. McN., age twenty-seven, para-III. Placenta previa centralis; accouchement forcé—version, extraction—profuse bleeding after delivery. Laceration of cervix into left broad ligament and through into peritoneal cavity. Uterus and vagina packed with gauze. About three hours later pulse began to fail and patient died in one-half hour.

Case X.—*Traumatic Rupture.*—C. N. 1243. A. D., age thirty-seven, para-VII; at term. Second stage not known. Total duration of labor, forty-eight hours twenty-seven minutes. Time of rupture of membranes not known. Brought finally to hospital. Transverse presentation, embryotomy. Examination after delivery revealed laceration of cervix posterior and to left, considerable oozing; uterus and vagina packed with sterile gauze. Sudden death of patient on eighteenth day. Autopsy showed perforation of fundus uteri size of a lead-pencil, localized subacute peritonitis surrounding perforation. Cause of death—sepsis.

Case XI.—*Spontaneous Supture. Justominor Pelvis; Large Child.*—C. N. 1229. A. S., age twenty-eight, para-III; at term. Second stage eight hours. Total duration of labor, fourteen hours five minutes. Presentation breech, L. S. A. Presenting part suddenly receded and active bleeding began. On investigation it was found to be a ruptured uterus. Case transferred to hospital. Patient showed signs of increasing shock. Immediate hysterectomy decided on. Fetus and placenta delivered through abdominal incision—still birth. Patient died during operation. The rupture involved the uterus posteriorly, running from the right broad ligament across to the left side of the uterus, stripping away the left broad ligament.

Case XII.—*Traumatic Rupture.*—C. N. 1139. K. F., age thirty-two, para-VI; gestation six months. Placenta previa; accouchement forcé; manual extraction of fetus and placenta. Examination immediately afterward revealed a deep laceration into peritoneal cavity through the cervix and lower zone to the right posteriorly. Bleeding moderate but continuous, and general condition very poor. Uterus and vagina were tightly packed with iodoform gauze, but patient never rallied and died one hour and forty minutes later.

CASE XIII.—*Traumatic Rupture.*—C. N. 585. L. R., age twenty-eight, para-VII; at term. Second stage, three hours and forty-five minutes. Total duration of labor thirteen hours and forty-six minutes. Membranes ruptured spontaneously second stage. Impacted shoulder presentation. Prolapsus funis; podalic version and extraction; hand introduced for membranes, and rent discovered in left lower uterine segment and broad ligament. Packed with iodoform gauze and transferred to hospital. Hysterectomy performed. The rupture extended through the cervix and through anterior fold of left broad ligament into peritoneal cavity. Pulse very weak at end of operation and death occurred six hours later.

CASE XIV.—*Spontaneous Rupture.*—C. N. 4164. Y. C., age twenty-six, para-III; at term. Second stage unknown. Time of rupture of membranes unknown. *Oblique irregularly contracted pelvis.* Patient in labor for three days; attempted forceps by outside physician. Admitted to hospital with uterus in state of tonic contraction. While undergoing preparation for Cesarean section uterus ruptured. Abdomen incised, child found free among intestines; no signs of life. Oblique or nearly transverse rent in uterus anteriorly in lower zone, extending into left broad ligament. Hemorrhage almost absent. Hysterectomy performed. General condition good after operation. Recovery and discharge on forty-seventh day.

CASE XV.—*Traumatic Rupture.*—C. N. 4091, E. C., age twenty-nine, para-I; gestation seven months. Membranes ruptured artificially during first stage. Eclampsia, moribund on admission, rallied somewhat after infusion. Accouchement forcé, podalic version. After delivery symptoms of hemorrhage. Exploration revealed laceration in right side of cervix extending upward along right wall of uterus to a point 2 cm. above internal os into peritoneal cavity. Patient died during packing.

Autopsy.—Vertical laceration through right side of cervix and lower portion of the body of the uterus, involving also the right broad ligament.

CASE XVI. *Spontaneous Rupture.*—C. N. 4029. C. W., age twenty-six, para-IV; at term. Duration of second stage not known. Membranes ruptured in first stage spontaneously. Contracted pelvis. Previous labors: 1. forceps; 2. craniotomy; 3. Cesarean section. Cord prolapsed, with rupture of membranes in first stage. Labor pains severe, uterus ruptured some time (?) in second stage. Sudden signs of shock and profuse hemorrhage.

Version and craniotomy on after-coming head performed. Laparotomy immediately after delivery. Laceration transversely in lower zone, involving extensively the left broad ligament. Total hysterectomy. Death of patient the following day.

CASE XVII.—*Traumatic Rupture.*—C. N. 3344. T. B., age thirty-four, para-V; at term. Duration of second stage not known. Total duration of labor not known. Time of rupture of membranes not known. Patient admitted to hospital with rupture of uterus subsequent to version by outside physician. General condition very poor. Laparotomy and hysterectomy immediately done. Death before completion of operation. Uterus showed two complete tears in posterior wall and one in anterior, transversely in lower zone. Peritoneum was stripped off from right lateral wall of pelvis. Abdominal cavity full of blood.

CASE XVIII.—*Traumatic Rupture.*—C. N. 3108. I. P. D., M. Z., age twenty-five, para-I; at term. Total duration of labor thirty-one hours fifty-five minutes. Dry labor. Nonengagement of head after thirty hours with ruptured membranes. Cervix completely dilated manually. Attempted forceps; podalic version and extraction. Hemorrhage profuse after delivery. Transferred to hospital on second day and died same day. General peritonitis. Postmortem examination revealed rupture of bladder and transverse rupture of uterus.

CASE XIX.—*Traumatic Rupture.*—C. N. 3080. E. S., age forty, para-VI; at term. Total duration of labor three hours and thirty minutes. Membranes ruptured artificially in second stage. Hemorrhage profuse. Placenta previa centralis. Accouchement forcé, version and extraction. In manual dilatation, cervix gave way on left side, and it was evident rupture of uterus had taken place. Patient almost exsanguinated. Rupture extended through left side of cervix and lower segment upward into and through the left broad ligament. Hemorrhage checked by tamponade. Abdominal hysterectomy then performed. Patient stood the operation fairly well. Patient discharged in good condition on thirty-third day.

CASE XX.—*Traumatic Rupture.*—C. N. 409. B. J., age thirty-five, para-VIII; at term. Duration of second stage not known. Total duration of labor 120 hours and forty minutes. Membranes ruptured spontaneously in first stage. Patient in the care of a midwife for all this time. She was finally brought to the hospital in poor condition. Shoulder presentation, podalic version and extraction. Profuse hemorrhage after delivery. Laceration of uterus discovered on left side extending upward into broad ligament and into peritoneal cavity. Abdomen opened and uterus removed without cervix; hemorrhage and condition improved steadily for twenty-four hours, then sudden collapse and death.

CASE XXI.—*Spontaneous Rupture.*—C. N. 2804. H. L., age thirty-four, para-VII; at term. Duration of second stage three hours. Pains very strong. Total duration of labor fourteen hours and thirty minutes. Midwife on case. Membranes ruptured spontaneously in second stage. Lying-in Hospital doctor called in. An encephalic monster; head born, shoulders caught above brim. Patient in state of moderate collapse. Moderate hemorrhage. Extraction completed with aid of blunt hook. On examination of uterus, it was found to be ruptured. Uterine cavity then packed with gauze. After stimulation and infusion, patient was transferred to hospital. Large rent in uterus on left side extending vertically up into the broad ligament and through into the peritoneal cavity for about half the length of the uterine body, tearing open the base of the bladder and stripping off the peritoneum from the anterior surface of the uterine body for one-third its extent. Hysterectomy performed, but before the organ could be removed the patient died.

CASE XXII.—*Spontaneous Rupture. Justominor.*—C. N. 2787. M. M., age thirty, para-III; at term. Second stage three hours. Total duration of labor ten hours twenty-eight minutes. Membranes ruptured prior to arrival of Lying-in Hospital doctor at beginning of second stage. Patient found in state of collapse. Profuse hemorrhage. Version and extraction. Craniotomy on after-coming head. Uterus then found to be ruptured in both lateral attachments of broad ligaments and whole anterior vaginal attachment torn off. Wound packed with gauze. Patient rallied somewhat under stimulation and was sent to hospital. Hysterectomy performed; considerable shock from operation. Patient recovered, and was discharged on fifty-first day.

CASE XXIII.—*Traumatic Rupture.*—C. N. 1700. A. G., age eighteen, para-I; at term. Second stage, four hours fifty-three minutes. Total duration of labor fifty-two hours fifty-three minutes. Membranes ruptured spontaneously during first stage. Brow presentation; version and extraction; still-birth. After delivery patient showed signs of collapse. On vaginal examination a tear in the uterus, beginning at vaginal vault and extending almost to fundus on left side, was discovered. After delivery patient was transferred to hospital and admitted in condition of profound shock. After stimulation, hysterectomy performed. Good recovery made and patient discharged on twenty-seventh day.

CASE XXIV. *Spontaneous Rupture in Scar of Operation for Amputation of Cervix.*—C. N. 23417. S. K., age thirty-eight, para-IX; at term. Duration of second stage not known. Total duration of labor twenty-seven hours. Membranes ruptured spontaneously early in first stage. History of amputation of cervix, double hernia with Alexander's operation two years ago. When first seen by Lying-in Hospital doctor, patient was having considerable hemorrhage; moderate shock. Complete laceration of uterus at utero-vaginal junction transversely posteriorly, with tendency of intestines to prolapse. Uterus and laceration packed with iodoform gauze. High forceps, and dead fetus delivered. Patient became pulseless and was infused. General condition improved for a time, but died later of hemorrhage and shock.

CASE XXV.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 23350. R. D., age twenty-nine, para-VII; at term. Duration of labor not known. Membranes ruptured before arrival of Lying-in Hospital doctor. Pulse 124; patient extremely weak. Rupture of uterus diagnosed. Abdomen at once opened and child, which was in abdominal cavity, extracted. Tear extended from broad ligament of one side to the opposite broad ligament transversely and anteriorly, dividing the cervix from body of uterus. Right broad ligament was infiltrated with blood, the two layers of broad ligament being dissected apart. Amputation of uterus at the utero-cervical junction. Patient did not recover from the shock and died six hours after operation.

CASE XXVI.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 21167. M. M., age twenty-four, para-II; at term. Duration of second stage unknown. Total duration of labor eighteen hours twenty minutes. Membranes ruptured spontaneously during first stage. When seen by Lying-in Hospital doctor, there was profuse hemorrhage and severe shock. Child in abdominal cavity. Pulse imperceptible. Rent in uterus low down in lower segment almost transverse, nearly entire width of uterus out into left broad ligament and around to the posterior surface of the uterus. Abdominal hysterectomy immediately performed. Patient's condition at end of operation very poor. Did not respond to treatment. Gradually grew weaker, and died five hours after operation.

CASE XXVII.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 3267. C. S., age thirty-four, para-VII; at term. Duration of second stage not known. Total duration of labor twenty-three hours forty-five minutes. On arrival of Lying-In Hospital doctor, patient was suffering from marked shock; pulse 150; hemorrhage profuse. Examination revealed a deep laceration extending through cervix and lower zone into left broad ligament and through into peritoneal cavity. With great difficulty a still-born child was delivered by version and extraction. Operation lasted five minutes and caused little shock to patient. Peritoneum washed out through wound, many clots coming away; wound packed with iodoform gauze. The further progress of case was of steady dissolution. Stimulants were used, but no reaction took place, and the patient died thirty-six hours after delivery.

CASE XXVIII.—*Traumatic Rupture.*—C. N. 1198. H. S., age thirty-six, para-VI. Duration of second stage not known; duration of labor not known. Delivery podalic version. Membranes ruptured artificially, second stage. Patient had been bleeding for twelve hours rather severely before arrival of Lying-in Hospital doctor. Had been under care of two private physicians. Diagnosis was that of placenta previa. Patient extremely weak, lips white, and all symptoms of acute hemorrhage. After delivery of child and placenta, hemorrhage ceased. While attempting to extract placenta, coil of intestine was encountered, revealing a moderate laceration through the cervix and lower uterine zone posteriorly. Uterus and vagina tamponed. Shock was severe, patient rallied under medication for a time, but died at the end of thirty-six hours.

Case XXIX.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 3314. T. L., age twenty-three, para-II. Second stage, four hours and fifty minutes. Total duration of labor twelve hours and thirty minutes. Membranes ruptured artificially in second stage. Visited by Lying-in Hospital doctor (attending). Pains unusually severe at this time. House surgeon instructed to return in an hour and deliver with forceps if advance were slow. On his return he found presenting part had receded and funis prolapsed; pain had ceased; woman in collapse. Version performed and still-born child delivered. Transverse rupture found in lower uterine segment; no hemorrhage. Uterus packed with gauze. The condition of patient seemed to be one of improvement up to the fourth day, but she died suddenly on this day from heart failure.

Case XXX.—*Traumatic Rupture.*—C. N. 7263. F. G., age forty-one, para-XV; at term. Duration of second stage not known. Total duration of labor not known. Membranes ruptured before arrival of attendant. Considerable hemorrhage second and third stage. Case seen by Lying-in Hospital doctor one hour after beginning of second stage. Cord prolapsed, pulsating feebly. Version performed and child delivered; still-birth. While giving douche after the delivery of placenta, a rupture was discovered through the cervix on left side and up through the left broad ligament into peritoneal cavity. Uterus and vagina were at once tamponed. Pulse 120. Patient passed into state of collapse after operation, but rallied somewhat during night and continued to improve up to fifth day, when temperature ranged from 101° to 102.5°; pulse became more frequent and patient showed signs of sepsis. Death occurred on sixth day after gradual rise of temperature. Pulse became imperceptible and rapid increase of symptoms of sepsis.

Case XXXI.—*Probable Traumatic Rupture.*—C. N. 173. L. W., age twenty-four, para-III; at term. Duration of second stage eight hours and thirty-seven minutes. Membranes ruptured artificially at end of first stage. Contracted pelvis; hydrocephalus; skull perforated. Version and extraction. Birth of child was followed by profuse hemorrhage. On examination uterus was found to be ruptured; manual extraction of placenta performed with great difficulty. Patient stimulated and wound packed with iodoform gauze. On following day patient was transferred to hospital; condition at time of admission fairly good. Pulse 140. Hysterectomy performed. Rupture found to extend from base of left broad ligament across the lower posterior uterine zone to the right broad ligament and through the right side of cervix. Temperature varied from 100° to 104 1/2° during first two weeks. After this temperature fell to normal and wound healed rapidly. Patient discharged on forty-sixth day after operation in good condition.

Case XXXII.—*Probable Traumatic Rupture.*—C. N. 877. M. W., age thirty-three, para-VIII; at term. Duration of second stage seven hours thirty minutes. Membranes ruptured artificially two hours after beginning of second stage. Flattened pelvis. Prolapse of cord; attempted high forceps; unsuccessful; podalic version and breech extraction. Patient began to bleed actively. A vertical rent four inches in length was felt to exist in right side of body of uterus in lower segment through the cervix. Patient transferred to In-door Service immediately after delivery. Condition of extreme shock. Stimulants administered and hysterectomy performed. After operation symptoms of severe shock prevailed. Death on third day.

Case XXXIII.—*Traumatic Rupture.*—C. N. 29628. R. B., age forty, para-IX; at term. Hospital was called to case by outside physician who gave following history: Woman went into labor twelve hours (?) previously and had been attended by midwife, who, when the labor did not progress to her satisfaction, summoned to her assistance two outside physicians who gave the woman chloroform and applied forceps. This procedure was carried out for six hours, during which time the patient was given chloroform many times. Woman found with uterus in tonic contraction, vulva swollen and edematous. Pulse very weak and rapid. Head of fetus above brim. Cervix, four and a half fingers' dilatation. There was but little external bleeding. Patient rapidly became weaker, finally became pulseless, and died undelivered.

Diagnosis.—Rupture of uterus and bladder, found to exist after death. The rupture involved the lower uterine zone, anteriorly and transversely.

Case XXXIV.—*Spontaneous Rupture. Contracted Pelvis.*—C. N. 20365. S. E., age thirty-seven, para-VIII; at term. Duration of second stage not known; total duration of labor not known. Membranes ruptured spontaneously early in second stage after strong bearing-down pains for several hours. The patient suddenly became quiet, complained of pain and tenderness in abdomen; she began to bleed actively; pulse became weak and rapid. Vagina packed and stimulation administered by Lying-in Hospital doctor. Woman in state of collapse. After short time, podalic version and extraction were performed. Two hours after delivery temperature 98.6°, pulse 130, patient gasping for breath. Hand introduced into vagina; passed directly into abdominal cavity. There was found to exist a complete laceration of the uterus, through the cervix, the right broad ligament and the lower uterine zone anteriorly. A laparotomy was at once performed, a supravaginal hysterectomy being performed. Discharged on fifty-fifth day, cured.

CASE XXXV.—*Spontaneous Rupture. Deformed Pelvis.*—C. N. 18686. S. W., age thirty-two, para-VI; at term. Duration of second stage not known. Total duration of labor fifteen hours and fifty-five minutes. Lying-in Hospital doctor arrived in second stage. Midwife in charge of case for over four hours stated that patient had been having good strong pains. Soon after the doctor's arrival pulse suddenly became rapid, pains ceased, and patient went into state of moderate collapse; some hemorrhage. Forceps applied and head delivered with great difficulty. General condition at this time very poor; pulse 140, irregular and very weak. Examination showed rupture of uterus through lower uterine zone anteriorly and transversely, extending down through the right side of the cervix, involving also the anterior vaginal wall. Laceration packed with iodoform gauze, saline intravenous infusion. Preparation made for hysterectomy, but operation postponed as patient's condition seemed hopeless. Woman died at 10 P. M. of the same day.

CASE XXXVI.—*Traumatic Rupture.*—C. N. 4297. T. M., age thirty-four, para-IV; at term. Second stage not known. Total duration of labor eighteen hours. Membranes ruptured before admission. Brow presentation; contracted pelvis. Version attempted by outside physician; not completed. On admission uterus somewhat tonically contracted; version completed. Extensive rupture of uterus into and through broad ligament found to exist. On opening abdomen there was found to be in left broad ligament a laceration extending almost to fundus uteri on that side. Hemorrhage profuse; finally controlled after loss of an enormous quantity of blood. Vagina packed with gauze after removal of uterus. Patient was in very poor condition after operation and died within an hour from shock following loss of blood.

CASE XXXVII.—*Probable Spontaneous Rupture.*—Mrs. A. G., age thirty-seven; multigravida; started in labor October 12, 1906. The pains continued weak and far apart until October 15, when they became very severe. A midwife was called in. At 2 A. M., October 16, as the patient was making no progress despite her frequent and severe pains, two physicians were called in. The diagnosis of rupture of the uterus was made, and the child delivered by version.

At 9 A. M., October 16, the patient was removed to the hospital in very fair condition. There was but little hemorrhage; pulse 100 and strong. The uterus was fairly well contracted. There was a longitudinal rupture through the left side of the cervix, the left broad ligament, involving the lower portion of the uterus.

The patient was taken at once to the hospital and a panhysterectomy performed. The patient stood the operation fairly well. Convalescence proceeded satisfactorily, and the patient was discharged on the twenty-eighth day after operation.

The time of the rupture of the membranes could not be determined.

CASE XXXVIII.—*Spontaneous Rupture with Transverse Presentation.*—Mrs. A. G., Applic. No. 25871, para-III, age thirty-two, was admitted to my service at the hospital, July 12, 1909. She was in severe shock and was bleeding moderately but continuously. The patient had been delivered on the Out-door Service. She had been in labor with ruptured membranes for many hours before notifying our staff. When first seen by one of our physicians, she was found to have a transverse presentation, with one arm protruding from the vagina, and with the cord prolapsed and pulseless. There was considerable bleeding and a fair degree of shock. The child was easily delivered and the uterus and vagina tamponed. The patient was then transferred to the hospital to my service. A laparotomy was performed, as the tamponage did not seem to control the bleeding. There was an extensive transverse rupture at the utero-vaginal junction, involving the lower section of the inferior zone and tearing away the anterior leaf of the left broad ligament, opening up the left uterine vessels. The bladder was badly macerated and could not be satisfactorily repaired. The uterus had to be removed. The pelvis was lightly packed with gauze and the abdominal wound closed. The operation was rapid with but little extra loss of blood. The patient, however, succumbed a few hours later, from shock more than from hemorrhage.

CASE XXXIX.—*Spontaneous Rupture, Simple Flat Pelvis.*—Mrs. A. M., C. N. 10107, para-II; was sent into the hospital from the Out-door Service with the diagnosis of rupture of the uterus. Patient was taken to the operating-room at once. She was in very fair condition. An abdominal panhysterectomy was performed. The patient made an uneventful recovery. There was a simple flat pelvis. After a long labor, with severe pains, there had been a sudden cessation of these, accompanied by great abdominal distress. There was little hemorrhage, but the pulse became rapid. A version was performed and the child extracted. On introducing the hand for the version, the operator found a vertical rupture on the left side, involving cervix, broad ligament, and extending well up toward the fundus. After the version, the uterus and vagina were packed and the patient transferred, as stated above, to the hospital.

CASE XL.—*Probably Primarily an Instrumental Rupture.*—Mrs. M. B., C. N. 11294, age twenty-seven, para-III; was in active labor, under the care of two outside physicians, for over thirty-six hours before entering hospital. Forceps had been tried repeatedly. On admission, she was in a state of marked shock, and died soon after, undelivered. There was a wide rupture of the uterus on the left side, extending both vertically and transversely on the anterior wall. Both child and placenta were free in the general peritoneal cavity; the latter also contained many foul-smelling blood-clots. There was a moderate contraction of the pelvis.

CASE XLI.—*Flat Generally Contracted Pelvis; Spontaneous Rupture in Cesarean Section Scar.*—Mrs. B. A., C. N. 11607, age twenty-five, para-III; had a generally contracted flat pelvis. The first labor was instrumental; the second was a Cesarean section. When admitted at the present time, was again in labor. Had been having pains for a few hours; the membranes were unruptured; the cervix only slightly dilated. A Cesarean section was decided upon again. On opening the peritoneal cavity, a number of blood-clots and some fresh blood were found in the lower portion of the abdomen. On inspection of the uterus, the cause of the clots was discovered in a beginning rupture, in the line of the former Cesarean section wound. The rupture was at the lower angle, was of moderate size, and through this opening the membranes were seen bulging out. The Cesarean section proceeded as usual. Uneventful recovery.

CASE XLII.—*Spontaneous Rupture in Cesarean Section Scar.*—Mrs. B. G., C. N. 11372, para-IV; was admitted to my service at the New York Lying-in Hospital on December 10, 1907. Patient had been delivered in 1904 by Cesarean section because of a flat rachitic pelvis, after a labor of thirty-six hours, with the cervix admitting three fingers. A long abdominal incision was made, extending below the umbilicus. A longitudinal incision was made in the uterus. The uterine wound was closed with three layers of suture—the first two of chromic gut, the last of plain catgut.

In 1906, a second Cesarean section was performed by Dr. Lobenstine, as the child was much too large to be delivered through the natural passages. The abdominal incision was shorter and higher than in the first Cesarean section. The incision was made well up in the fundal region, but was somewhat longer than usual, as the presentation was a breech with prolapsing feet, thus necessitating a version from above. The uterine wound was closed in three layers as in the previous instance, but plain catgut was used throughout. The scar of the first operation was not noticed at this time. Recovery was uneventful.

Present History.—The patient was brought to the hospital in a condition of extreme shock. She was found to have a ruptured uterus the rupture having taken place at least eighteen hours before. On admission, the abdomen was markedly distended. The fetus could be plainly felt. The entire abdomen was exquisitely tender. Vaginally, the cervix was found to be soft, 2.5 cm. long and slightly dilated. No presenting part could be felt. The pulse was barely perceptible. The patient looked as if she would die at any moment. Rapid preparation was made for an operation; with the beginning of the operation an intravenous saline infusion was given. The peritoneal cavity was opened through an incision 10 cm. long, the incision extending both above and below the navel. The child and placenta were found free in the peritoneal cavity and were at once removed. The uterus lay in the posterior part of the abdomen and was opened up vertically from the internal os to the fundus along the anterior wall. The rupture was through one of the Cesarean section wounds, and was so extensive that the whole uterus was flattened out. A supravaginal hysterectomy was done, all blood-clots removed, a gauze drain was passed down through the cervix and a second one brought out through the lower angle of the abdominal wound. The wound was closed rapidly in three layers. Dry, sterile dressings were applied and the patient was further treated for shock and hemorrhage. The pulse at the end of the operation had improved under the saline infusion.

The patient did surprisingly well after the operation. She recovered rapidly; for the first seven days her temperature never rose to 100° F., while the pulse ran between 90 and 100. She was to sit up on the eighth day, but at this time she contracted a lobar pneumonia of the right side. The process was a severe one and caused her death eight days later; *i. e.*, the sixteenth day after operation.

On examination of the specimen, there was an *undilated cervix* and the uterus was opened up from the internal os to fundus, along one of the Cesarean section scars. To the right of the rupture was seen the high scar of the other operation. Had the patient entered the hospital as she had been advised to do, before or at the beginning of labor, this seeming accident could have been avoided. Inasmuch as the pelvis was severely contracted and the cervix very rigid from never having been dilated above 4 cm., the uterus gave way at its weakest point, which was evidently the lower angle of the Cesarean scar.*

CASE XLIII.—*Traumatic Rupture.*—Mrs. G. D., C. N. 8099; age twenty-five, para-II; was admitted two days postpartum, to the hospital. Patient was in very bad condition. The face was pinched; the pulse very rapid; the abdomen distended and tender. She had been delivered by a version for transverse presentation.

After admission, a laparotomy was performed at once. There was some free blood in the peritoneal cavity. There was a vertical rupture extending up into left broad ligament through the left wall of the uterus. A panhysterectomy was performed. The patient died the same day.

Diagnosis.—Transverse presentation; delivery by version.

CASE XLIV. *Traumatic Rupture.*—Mrs. J. K., C. N. 6096, para-II; had been in labor for many hours before admission. An outside physician had attempted forceps without success. Patient's condition was very poor. The diagnosis of ruptured uterus was made (as probable). The child was delivered by an internal podalic version, and the after-coming head perforated, as the child was dead. On palpating the interior of the uterus, it was discovered to be badly ruptured on the left side, with a vertical laceration. The condition was so bad that nothing could be done but a tamponage of the uterus and vagina. Patient died a few hours later.

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* Rep. JOURNAL of OBSTETRICS, July, 1908.

CASE XLV.—*Spontaneous Rupture. Generally Contracted Pelvis.*—Mrs. Q. A., C. N. 4860, age thirty, para-V, twins; was admitted to the hospital in desperate condition. Face pinched and pallid; pulse 150 and of poor quality. One child had been delivered by the patient's physician, but the second child, being a shoulder presentation, he had been unable to deliver. In the hospital, this second child was easily delivered by version, and it was then discovered that a rupture existed which extended across the lower zone anteriorly and up into the folds of the left broad ligament. A laparotomy was at once performed. Much free blood was found in the peritoneal cavity. A supravaginal hysterectomy was carried out. The raw surfaces were closed in.

The patient died a few hours later.

CASE XLVI.—*Spontaneous Rupture. Moderately Flat Justominor Pelvis.*—Mrs. C. P. Patient a multipara with a moderately contracted pelvis. Her former labors had all been difficult, and in the present labor she failed to notify the staff until she had been in labor many hours. When first seen, about 2:30 P. M., there was considerable bleeding and the patient pretty well exhausted. She was seen by an attending surgeon about 4:00 P. M., who found that there was a small complete rupture of the uterus, running transversely through the anterior wall. He decided to do a version at once. Having done this with considerable difficulty and having extracted the child, it was found that the tear now extended high up at the left side through the left uterine vessels. Uterus was at once packed and patient sent into hospital. The patient was in shock, pulse 120, hemoglobin 50 per cent. There was moderate bleeding from the uterus. Abdomen was very tender. Hysterectomy was at once done. In this case the small stump of cervix that was left behind was closed over with peritoneum without any pelvic drainage; which procedure we believe, as a rule, is unwise. The peritoneal cavity was washed out with normal salt solution and the abdominal wall closed in three layers. The patient rallied considerably and gave us some hope of living. However, she passed away on the fourth day as a result of shock, anemia, and low-grade infection.

RUPTURE AT THE UTERO-VAGINAL JUNCTION, WITHOUT ACTUALLY INVOLVING THE UTERUS.

There have been only three cases in our series of this condition. In numerous other instances the vaginal vault was opened, but in each instance there was more or less destruction of uterine or cervical tissue, so that they could not be classified under this heading.

Case I.—*Traumatic Rupture.*—Mrs. F. F., age thirty-five, C. N. 6269, para-VI; all labors had been difficult. Patient admitted in labor, having been in the care of an outside physician who had tried to perform a version. Forceps had also been attempted unsuccessfully. She was in bad condition. The pulse was rapid and feeble; the color bad. There was moderate bleeding. *The pelvis was markedly contracted.* The child was dead. It was delivered with some difficulty. The uterus and vagina were tamponed with iodoform gauze. There was a large opening into the general peritoneal cavity through the posterior vaginal vault. The patient died forty minutes after delivery.

Case II.—Mrs. A. L., C. N. 4799, age thirty-five, para-VI; was brought to the hospital five hours postpartum. There was found to be a wide rupture of the vaginal vault posteriorly, opening into the general peritoneal cavity. A large coil of intestines presented in the vagina. There was moderate bleeding; the cervix was not torn. The intestines could not be replaced satisfactorily from below. A laparotomy was therefore performed, the intestine drawn up into place and thoroughly irrigated, and the opening in the posterior vaginal vault sutured. The abdominal wound was closed.

Recovery uneventful.

Case III.—*Traumatic Rupture.*—Mrs. R. K., C. N. 8662, age thirty-five, para-IV; was admitted to the hospital still undelivered. She had been in labor for two days; forceps and version had been unsuccessfully tried by outside physician. In the hospital a craniotomy was performed. On removal of placenta, intestines were felt with the exploring hand. There was found to be an extensive rupture at the utero-vaginal junction. An immediate laparotomy was performed. The uterus was found to be torn away from its attachment to the vaginal vault for three-fourths of its circumference. The uterus was quickly removed, and the pelvis lightly packed with iodoform gauze. Abdominal wound closed. Patient discharged on forty-first day.

Ruptures of the vaginal vault without damage to the uterus are seen most frequently in transverse presentations and as the result of trauma with forceps or other instrumentation. The relative frequency of involvement of anterior and posterior vaginal vaults may be seen from the following figures, viz.:

Hugenberger gives an equal percentage.

Stschotkin reports thirty-six posterior ruptures and twenty-four anterior, while Kauffmann gives the relation as thirty-two posterior to twenty-three anterior.

v. Winckel believes very ardently in the theory that transverse presentations becoming impacted are responsible for a large percentage of these tears. Kauffmann showed in his figures that 30 to 40 per cent. of vaginal vault ruptures were due to transverse presentations. Stschotkin found that 15 per cent. were dependent upon this cause. On the other hand, Knoblauck found that only 8.25 per cent. of his cases occurred in transverse presentations; Kormann, 11 per cent., and Trask in 5.25 per cent.

Probably many cases are due not directly to the abnormal fetal presentation, but to the version or other manipulation necessary to deliver the child.

The essential point of interest lies in the fact that, in these cases which occur spontaneously, there is usually a very great overdistention and overstretching of either anterior or posterior vaginal vault. This occurs in faulty presentations of the fetus, with more or less pelvic contraction. Hand in hand with the overstretching of the vaginal vault goes, of course, the thinning-out and stretching of the lower uterine zone. In some cases the rupture occurs at the vaginal vault; in other cases the lower uterine zone is involved. If, however, the lower uterine zone does not rupture, we must believe with v. Winckel, Schröder, and Veit, that the lower zone is, in such instances, more or less protected by both the round ligaments and the broad ligaments with their hypertrophied connective-tissue framework. The pelvic contraction is usually of a high grade.

INCOMPLETE RUPTURE OF THE UTERUS.

Incomplete ruptures of the uterus occur less often than the complete. Brenneke gives the proportion as eight to 100; Sauvage, in an assembled list of 167 cases of ruptures of the uterus, found eighty-seven complete and fifty-eight incomplete ruptures; Marx reports forty-six incomplete and 181 complete from the literature. In the Lying-in Hospital series there have been twenty-nine incomplete ruptures and forty-six complete (with three ruptures of vaginal vault).

An incomplete rupture may occur in any portion of the uterus. The most common type, in our experience, has been the longitudinal laceration through one side of the cervix, through the lateral vaginal fornix and up into the broad ligament. In the severe cases, the tear involves more or less of the lower uterine segment, opening up either the main uterine vessels of the side involved or one of the branches only of the uterine artery. The next most common type of incomplete rupture has been a transverse one through the cervix into the utero-vesical space. The incomplete ruptures that occur higher up in the uterus are not as serious and are less common. The incomplete ruptures may be either traumatic in origin or spontaneous. When due to traumatism, we find that they are caused by: 1. accouchement forcé; 2. forceps; 3. version; 4. extraction of after-coming head; 5. embryotomy or craniotomy; 6. rubber balloons. The rapid artificial dilatation of the cervix is undoubtedly the most common traumatic cause of an incomplete rupture. The severest lacerations, I believe, are seen where the Bossi dilator is used to its full extent. Dilatation for "placenta previa centralis" gave the greatest number of such lacerations in our series. In our list of twenty-nine incomplete ruptures, there were thirteen cases of placenta previa, in which the laceration was due either to the dilatation or the extraction of the after-coming head. There were 6 cases due to the rapid dilation in eclampsia and version. In these cases, the tear probably started during the dilatation and was extended by the after-coming head being drawn too forcibly through the remaining cervical ring. In five cases the rupture was due to a hasty delivery in the presence of a violent "accidental hemorrhage." In the remaining five cases the rupture seems to have been spontaneous in origin. The normal cervical tissue, although thinning out more and more during the progress of labor, will yet stand a great deal of stretching. But there comes a time when even the normal tissue gives way in the presence of faulty engagement of the presenting part in the cervical ring, as in a transverse position of the fetal head, etc. *The more frequent cause for the spontaneous origin is old scar tissue in the cervix proper or in the vaginal vault.* In our list of twenty-nine cases the rupture occurred in the left side in fifteen cases; on the right side in ten cases, and anteriorly in four cases.

MORTALITY.

In the forty-six cases of "complete rupture" of our series there were thirty-four deaths, giving a mortality of 73.9 per cent. In the three cases of rupture of the vaginal vault there was one death, giving a mortality of 33 1/3 per cent. In the twenty-nine cases of "incomplete rupture," there were eight deaths, or a mortality of 27.5 per cent.

The gross mortality, then, in our list of seventy-eight cases was 53.8 per cent.

It should be mentioned, however, that the cases that died with "*incomplete rupture of the uterus*" were suffering from either placenta previa centralis or eclampsia, both of which have in themselves a fairly high mortality. Our mortality rate in "complete rupture" was high (the average in the recent literature being about 60 to 65 per cent.), but we believe that we can honestly claim that practically all of such cases that have come under our care have been of the severest type with but little chance of life.

FETAL MORTALITY.

The fetal mortality in the series of forty-six complete ruptures was 83 per cent.

In the three ruptures of the vaginal vault the mortality was 66.6 per cent.

In the twenty-nine cases of incomplete rupture the mortality was 52 per cent.

The total fetal mortality was 70 + per cent.

TREATMENT. PROPHYLACTIC.

1. Have the patient in as good physicial condition as possible at the time of labor.

2. Be aware in time of the presence of a deformed pelvis; of pelvic tumors; fetal anomalies, etc.

3. Remember the *dangers of a prolonged dry labor.*

4. Do not allow the *second stage* to be *prolonged*, particularly if the uterine contractions are very severe.

5. Do not be *too speedy* in the dilatation of the cervix when doing an "accouchement forcé." Remember the ease with which the cervix in a "placenta previa centralis" can be torn.

6. Do not *perform or even try a version in a "tonic-uterus," or one that is rapidly becoming tonically contracted.*

7. Do not apply forceps with a rigid rim of cervix still present.

8. Every Cesarean section case in a subsequent pregnancy must early be warned of *possible danger* at the time of labor, if not under proper supervision.

9. Finally, ever keep in mind the danger-signal—the warning symptoms of an impending rupture. When they develop, deliver at once in the safest manner for the mother.

TREATMENT AFTER THE OCCURRENCE OF THE RUPTURE.

(A). *Treatment of Ruptures of the Vaginal Vault.*

These cases, if the diagnosis of the extent of the laceration is correct, can in most instances be treated by tamponage with or without sutures. In case intestines or omentum give trouble, an immediate laparotomy should be undertaken with either total or partial closure of laceration. In rare instances the uterus is torn away so extensively that it has to be removed.

(B) *Treatment of Incomplete Ruptures.*

Nearly all such cases are best treated by firm tamponage with or without sutures. A laparotomy is rarely indicated and only then when hemorrhage persists despite the conservative treatment. After the tamponage, pressure may be exerted—for several hours, if necessary—from above. At times it may be advisable to lessen the blood supply to the pelvis by pressure on the abdominal aorta.

There are cases of "incomplete rupture" in which the tear simply opens into the broad ligament *without* involvement of the lower section of the cervix. In such cases a tamponage of the broad ligament may be impossible. The uterus and vagina should be packed and counterpressure exerted from above. The broad ligament hematoma may have to be opened later, either from above or from below.

(C) *Treatment of Complete Ruptures.*

(a) The child should be delivered *at once*, providing it is still "*in utero*," in the presence of a bad rupture, with great shock or hemorrhage or both. If, in these cases, a laparotomy can be done at once, on the spot, without the transference to a hospital, it should be performed. Where this is not feasible, we believe that better results will be obtained by tight tamponage of the uterus and vagina rather than by removal of the patient to more convenient surroundings.

(b) On the other hand, if the diagnosis is made early in the presence of a comparatively mild rupture, with the child still in the uterus, there are two methods of procedure, namely: 1. If the *child is alive*, and if the mother is in fairly good condition, she should be transferred very carefully at once to a hospital, where an immediate laparotomy should be done. This offers the best prospects for both mother and child. 2. If the child is dead and the mother in fairly good condition, we can deliver at once in the simplest manner, and treat the rupture by "tamponage," if we think this method will answer; otherwise, we should perform a laparotomy *at once, on the spot*. If we are not willing to run the risk of having to operate at the patient's home, we should, as in (1), transfer the case *before delivering*. The writer cannot urge this point too strongly, for the delivery of the child after the uterus has ruptured will probably increase the size of the tear, thereby increasing the amount of shock and hemorrhage and increasing the dangers of transportation.

(c) If the child and placenta are free in the peritoneal cavity, a laparotomy is practically always necessary. Here, again, if the patient is in extreme shock, if any procedure is attempted it should be done at once on the spot.

(d) Where the diagnosis of rupture is first made *after* the delivery of the child, if the rupture is not extensive and the shock and hemorrhage are not great, it may seem advisable merely to use a carefully applied tamponage with or without partial suturing.

Should a laparotomy be decided upon, we may: 1. simply irrigate the peritoneal cavity and drain through the laceration (having, of course, removed the child and placenta); 2. we may suture the rupture, according to the method of Zweifel; or, 3. we may perform either a supravaginal or a panhysterectomy, and drain from below.

In all of our cases in which a laparotomy was performed, it was found necessary to remove the uterus (excepting in the case of the Cesarean section that recovered) either because the bleeding could not otherwise be controlled or because of the tremendous destruction of tissue. Should the patient recover from her shock and hemorrhage, we must always fear the development of peritonitis or a general sepsis.

Although the abdominal operation was often of no value, still the mortality in the twenty-nine cases operated upon was reduced to 62 per cent.

A vaginal hysterectomy can be performed, but this, too, is rarely, in our opinion, advisable, owing to the difficulties presented by the great damage resulting from the rupture.

The general treatment for the hemorrhage and shock should be given at once.

The vital question is, of course, shall we perform a laparotomy or shall we rely upon tamponage and drainage. Although there is a great deal to be said on either side of the question and although there are statistics in favor of each standpoint, I believe, nevertheless, that with improved technic, the best results will be obtained with an abdominal hysterectomy (or suture of wound when possible), excepting in (a) clean cases with relatively small amount of trauma, with hemorrhage controlled by packing, and (b) bad cases with marked shock.

In the former the abdominal operation will seldom be necessary, while in the latter the operation can be of little value. Real success will come and, I believe, can only come to those operators who see their cases at the actual time of the "rupture" or very soon thereafter. Transportation of the patients in extreme shock materially decreases the chance of a recovery.

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67 EAST FIFTY-FIFTH STREET.

DISCUSSION.

Dr. E. Gustav Zinke, of Cincinnati, was surprised at the number of cases of rupture of the uterus which had occurred even though the number of deliveries ran up to 60,000. He wished to emphasize a few points which were of practical importance to the general practitioner, especially the one who took obstetric cases. Rupture of the uterus, from a purely obstetric cause, should not occur in the hands of anyone who knew obstetrics. We could not prevent rupture of the uterus produced by a Cesarean section, myomectomy, or the result of a kick, of a bullet, or a stab, or by the horns of cattle. But rupture of the uterus due to delayed labor, the result of an obstruction, which the physician encountered in the passage of the child, should be wiped from the record. Knowing the doctrine of narrow pelves, as it was understood now, no man had a right to carry a patient to the verge of rupture of the uterus, and the clinical picture which surrounded, or which brought the threatening danger, was so distinct and so well marked that no man could possibly overlook it. A woman who was in a long second stage of labor should arouse suspicion. The man who had taken a history of his case and studied his patient carefully would know in advance whether he had trouble to look for or not, and he would be on his guard and would detect the symptoms that were indicative of rupture.

Dr. Zinke described in detail two cases of rupture of the uterus that had come under his observation, one of them occurring with the use of the Bossi dilator.

Dr. Edward J. Ill, of Newark, New Jersey, spoke of rupture of the uterus produced by forceps applied high in cases of non-retracted cervix. A dilated cervix did not mean a retracted cervix and, as a rule, the forceps should not be put on the fetus until the cervix was retracted. This was an old rule, but little followed.

Dr. Lobenstine, in closing the discussion, said that the remarks of Dr. Ill were true, and that the application of the forceps high up was responsible for a tremendous amount of damage.

OVARIAN PREGNANCY AT TERM, WITH RECOVERY OF MOTHER AND CHILD. PRELIMINARY REPORT OF A CASE.[1]

BY

WALTER C. G. KIRCHNER, M. D.,

St. Louis,

Superintendent, City Hospital.

(With Three Illustrations.)

Ectopic gestation progressing to maturity with recovery of mother and child is a condition sufficiently rare to warrant a special case report. The case, moreover, becomes one of especial interest when its relation to ovarian pregnancy can be established. Of the recognized modes of extrauterine pregnancy, the most unusual form is that of ovarian pregnancy.

The subject of ovarian pregnancy has been carefully reviewed by Williams (*Gynecol. and Abd. Surg.*, Kelly-Noble), and recently also by C. C. Norris (Primary Ovarian Pregnancy and Report of a Case Combined with Intrauterine Pregnancy, *Surg., Gyn., Obs.*, ix, 2, p. 123, 1909). Williams classified thirteen cases as positive, and Norris collected and tabulated nineteen undoubted cases. Of the cases collected by Williams, those of Gottschalk and Ludwig went to term. Of thirty-four cases designated as positive, highly probable or probable, in eleven the pregnancy went to term, showing that the ovary can accommodate itself more easily than the tube to the growing pregnancy.

Regarding the theories of impregnation and development, ovarian pregnancy is thought to result from the fertilization of the ovum before its escape from the Graafian follicle. The diagnosis of ovarian pregnancy is said to be conclusive when the requirements demanded by Spiegelberg are complied with, namely:

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

1. That the tube on the affected side be intact.

2. That the fetal sac occupy the site of the ovary.

3. That the sac be connected with the uterus by the ovarian ligament, and,

4. That definite ovarian structure be found in its wall.

In addition, Williams believes that ovarian tissue should be demonstrated in several portions of the sac wall. It must be evident also, that as pregnancy advances and the ovarian structures become attenuated, the difficulty of finding ovarian tissue increases, and it is on this account that many of the advanced pregnancies have been placed among the doubtful cases.

The history of the case that comes to our attention is as follows: the patient, No. 6224, a colored female, thirty years of age, was admitted to the St. Louis City Hospital November 27, 1908. She was a laundress by occupation and there was nothing in her habits of special interest.

Family History.—Her father and mother had died from causes unknown. One brother is living, but two brothers and two sisters died in infancy. There was no history of tuberculosis, malignancy or insanity.

Past History.—Patient had had the usual diseases of childhood. She had never been sick or confined to bed except at childbirth. Menstruation began in the sixteenth year and has always been regular except when pregnant. She married at the age of twenty-one and has had eight children. Seven years ago she gave birth to twin boys, five years ago had a miscarriage, and has had two children since. Three children are living, the rest having died in infancy. The menstrual flow usually reappeared one to two months after childbirth. Her last child was born November 23, 1907.

Present Illness.—The patient entered the hospital believing that she was pregnant and according to her belief had gone beyond term. After birth of last child patient had regular menstruation for three months. Last regular menstruation occurred February 15, 1908. She missed in March, but on April 14 lost an unusual amount of blood and thought she was having a miscarriage. In addition to clots of blood she states that a soft, pinkish substance was expelled, in size somewhat smaller than an egg. On the morning of this day she fainted, became dizzy and fell back in bed. She complained of pain in her womb, but this soon subsided. The flow of blood lasted for two weeks and weakened her a great deal. A doctor was called in, who prescribed for her and thought she had a tumor. He made no special examination. During the succeeding six weeks, she was occasionally confined to her bed, and from the last of April to the birth of the child there were no uterine hemorrhages. On May 14, she had a sinking spell and experienced hot flashes in the face. The flashes were noticed during a period of three or four days. She also had nausea and vomiting, and about this time began to feel pain in the lower part of the abdomen on the right side. She noticed two "lumps" in the lower abdomen, one in the center and the other on the right side. She called at the office of another physician, who said the womb was enlarged and ordered douches.

In June the mass gradually moved over toward the left side and the pain became less. The pains that she had complained of were of an aching character and she felt that something on the inside was pulling and seemed to cause a soreness. This pain prevented her from being active on her feet and she found it necessary to support the abdomen. On June 6, a physician who had examined her stated that she had a tumor. She felt nauseated and experienced hot flashes on the 14th, but these sensations afterward left her permanently. For the most part she was constipated and had to take salts frequently. She experienced but little trouble with her bladder. Notwithstanding the various diagnoses, the patient believed herself pregnant, her abdomen was getting larger, and early in July she felt fetal movements. During the months of July, August and September she felt quite well, but was obliged to stay mostly in her room.

In October the patient felt well enough to leave the house and went to a market-place four blocks distant. On her return she felt something give way in the vagina and she was obliged to support the womb by pressure from below until she reached her home. A physician who was called in replaced the womb in the pelvis. There was some uterine hemorrhage, but no abdominal pain. The womb remained in position for three weeks, when it again prolapsed and was pushed back by the patient. According to the patient's calculation, she was to give birth to the child on November 15, and on this day she began to have pain in the back and bearing-down pain in the womb. The pains were about ten minutes apart and continued for two days. A physician who examined her thought she had false labor pains and expected to be sent for when labor started. Twelve days later, after a pronounced edema of the cervix associated with prolapse of the uterus had taken place, the patient entered the hospital.

Physical Examination.—Patient was well nourished and about five and a half feet in height. Head, trunk and extremities well developed. Respiratory and circulatory systems practically normal. Temperature 99.6°, pulse 118, respirations 28. The urine was normal, bowels were constipated. Nervous system was normal. Abdomen was enlarged as in pregnancy, but somewhat asymmetrical, the left side being fuller than the right. The breasts were flabby and but moderately distended with milk. Inspection of genitalia showed prolapse of uterus with edema of cervix and an old laceration of the perineum. The cervix was perhaps more than two inches in diameter and completely filled the vagina. The fetal heart sounds were easily heard and were loudest to the left and a little below level of the umbilicus. Under general anesthesia the assistant physician made a more complete vaginal examination and found that the uterus was empty and that delivery through the natural channel was impossible. Diagnosis, extrauterine pregnancy, edema of cervix. Treatment, abdominal section.

Operation.—Under general ether anesthesia, a long median incision was made extending from the umbilicus to the symphysis pubis. On examination of the abdominal cavity a large, cystic and tumor-like mass was found occupying the lower two-thirds of the abdominal cavity. There were numerous omental and intestinal adhesions. It seemed at first as if we were dealing with pregnancy complicated by ovarian cyst. The intestinal adhesions were liberated, and the omental adhesions were ligated and severed. The mass, which now resembled an ovarian cyst containing a fetus, was freed on all sides and was partially delivered through the abdominal incision. Median incision of this mass was made, which incision happened to be over the site of the placenta. The bleeding here was profuse. The sac was opened and the contents, a matured fetus, removed. The fetus occupied a somewhat longitudinal position, the back being toward the left. The head was above and was flexed forward on the chest. The arms and legs were folded in front of the body. The cord appeared normal.

The child soon after delivery opened its mouth and made efforts at respiration. It was placed in the hands of an assistant, who quite easily resuscitated the child. The sac was shelled free from the abdominal cavity. The appendix had become adherent to one portion of the sac and after careful ligation was severed. The sac originated from the right side in the region of the ovary and it was here that the main blood supply was obtained. A sort of pedicle in the region of the right ovary was ligated with interlocking stitch and was severed. In ligating the adhesions on the left side, the tube was also removed.

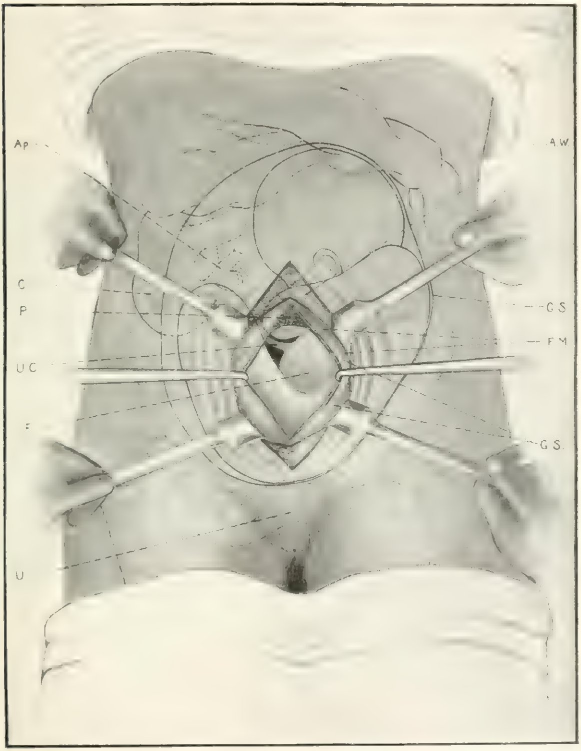

Fig. 1.—Diagram showing ovarian pregnancy at term. A. W. Abdominal wall. G. S. Gestation sac. F. M. Fetal membrane. A. P. Appendix. C. Cecum. P Placenta. U. C. Umbiblical cord. F. Fetus. U. Uterus.

The uterus was somewhat larger and softer than normal and occupied the central and dependent portion of the pelvis. The fetal membranes separated easily from the sac and the denuded portions were greenish-yellow in color. The amniotic fluid was greenish-yellow in color and was turbid. Some of it escaped into the peritoneal cavity. The sac and contents having been removed, the abdominal cavity was flushed with saline solution and flank drainage on either side instituted. The abdominal wound was closed in layers. The operation was performed in less than thirty minutes. The patient suffered considerably from shock and was put to bed in a critical condition. She was given hypodermoclysis of saline solution and stimulants, and gradually rallied from the operation. The child seemed normal in every respect. At this operation, I was most efficiently assisted by Drs. Cleveland H. Shutt and Rodney J. Bunch.

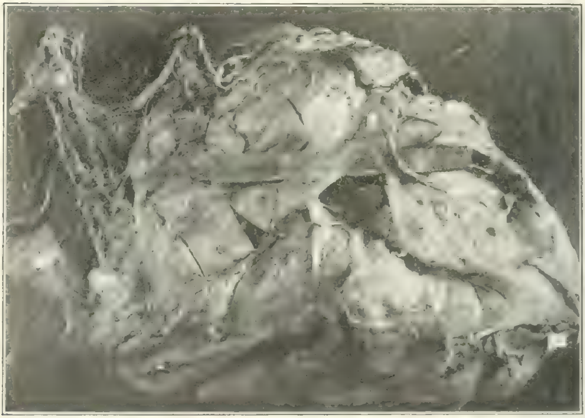

FIG. 2.—Posterior view of gestation sac. External surface. O. Omental adhesions. A. Appendix. L. T. Left tube. O. V. Ovarian vessels. U. L. Utero-ovarian ligament.

Post-operative Course.—The patient developed a localized peritonitis, and endometritis. She ran a febrile course, and owing to her weakened condition and a bad cystitis, her convalescence was somewhat protracted. She ultimately made a good recovery and has assumed her usual vocation.

The Child.—The child is a full term male baby, well developed, with no deformities, but is somewhat poorly nourished. The skin is wrinkled, somewhat macerated and there is desquamation over entire body. There was a deficiency in the amount of vernix caseosa. Hair covering scalp normal, finger-nails well developed and projecting, toe-nails well developed. Child is a mulatto. Eyes, nose, mouth and genitalia are normal. No evidence of congenital disease.

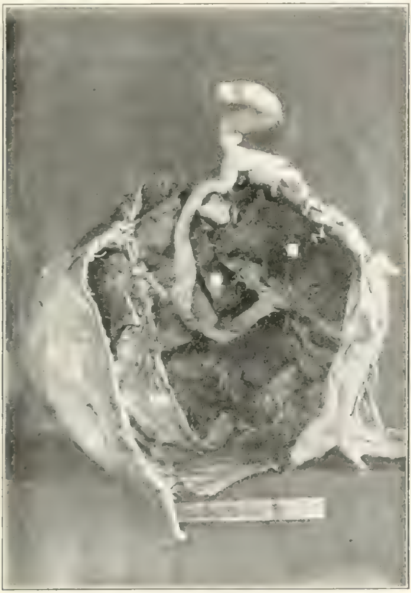

Fig. 3. Interior view of gestation sac. U.C. Umbilical cord. P. Placenta G S. Gestation sac. F.M. Fetal membranes. L.T. Left tube. R.T. Right tube.

Measurements.—Head, biparietal, 8.5 cm.; bitemporal, 7.5 cm.; fronto-occipital, 11 cm.; mento-occipital, 11 cm.; sub-occipito-bregmatic, 9 cm.; occipito-bregmatic, 10 cm.; bimastoid, 7 cm.; suboccipito-mental, 8 cm.; fronto-mental, 9 cm. Circumference of head around cinciput and occiput, 34 cm. Across shoulders, 12 cm. Chest: lateral diameter, 7 cm.; antero-posterior, 8 cm. Length, 48 cm. Weight, 6 3/4 pounds. The child was nourished by artificial feeding and thrived well. Both mother and child ten months later are in good health.

SPECIMEN.

Macroscopic Appearance.—It was not possible to at once prepare the specimen for microscopical examination and instead it was placed in Kaiserling solution. The specimen represented a closed bag opened by incision. The dimensions were 20 x 18 x 16 cm. The outer surface is partly roughened by torn bands of adhesions. The anterior surface is free. On the posterior surface, the severed appendix, 10 cm. in length, is densely adherent. On the upper surface are attached remnants of omental tissue. On the left side the severed left Fallopian tube, 6 cm. in length, is loosely attached. The tube is normal. The right tube is adherent to the right side of the sac in much the same manner as the appendix. The fimbriated end is covered over by adhesions, but has no connection with the interior of the sac. The tube is 11 cm. long and of nearly uniform diameter. At the lower part of the sac, there is a ligamentous structure resembling the utero-ovarian ligament. On the right side below and beyond the attachment of the right tube, there is a rather large and tortuous artery and large veins. There are also vessels leading into the sac from the omentum and left broad ligament. The interior of the sac is lined by placenta and fetal membranes.

The placenta is mostly situated on upper and anterior portions of sac and away from region of right tube. It measures 12 x 9 x 5 cm. and in one portion is 14 cm. across. The umbilical cord is 42 cm. long and 1.2 cm. in diameter. It divides into four branches; the two larger branches going to the placenta, the two smaller ones supplying the membranes. The placenta and especially the fetal membranes can be easily separated from the gestation sac. The gestation sac is less pliable than the fetal membranes and is mostly 1 to 2 mm. in thickness. The left portion of the sac is thinner than the right and numerous bloodvessels can be seen to ramify through this structure. Several portions of the specimen were removed for microscopical examination.

MICROSCOPIC EXAMINATION.

From the surgical standpoint the case is of interest in that both mother and child were saved. With the exception of a slight contracture of the left side of the neck and a slight asymmetry of the head, the child seems normal. This is also unusual in cases of ectopic gestation, where deformity or malformation is the rule.

A study of the specimen combined with the history of the case leaves little doubt as to the nature of the pregnancy, and it may be considered of the ovarian type for the following reasons:

1. The history of the case points to an ovarian pregnancy on the right side.

2. At operation a large gestation sac resembling an ovarian cyst was encountered, the pedicle or area of attachment being in the region of the right ovary. The main blood supply to the placenta was received from this site.

3. The uterus was comparatively free, slightly enlarged and centrally located, permitting prolapse.

4. The left ovary and tube were normal.

5. A right normal ovary was not found.

6. The right tube was adherent externally to the gestation sac in much the same manner as was the appendix, but otherwise the tube was found to be normal.

7. The placenta was located entirely within the gestation sac and was entirely free from attachment to any part of the peritoneal cavity. It occupied the anterior and upper part of the sac and had no relation with either tube.

8. There was no mass of ovarian tissue found, nor anything to indicate tubo-ovarian or abdominal pregnancy.

9. The physical characteristics of the sac are those of an ovarian cyst and microscopical examination gives evidence of ovarian structure and origin.

10. The gestation sac was attached to the uterus by a ligamentous structure and its position on the specimen seems to indicate that the right tube did not become adherent to the sac until it had attained considerable size.

These conditions practically conform to Spiegelberg's requirements for the demonstration of ovarian pregnancy.

City Hospital.

DISCUSSION.

Dr. E. Gustav Zinke, of Cincinnati, said that ovarian pregnancy, pure and simple, was a very rare thing, and he was glad that, at last, a case was brought before the association which left absolutely no doubt in our minds as to its real character. It was remarkable what nature would not do under these circumstances when the ovum was implanted ectopically. The most frequent cases of ectopic gestation which went to term were those where the tube held out to the last. It was comparatively rare, it was true, but those were the cases in which there were no adhesions between the abdominal viscera and the ectopic gestation sac. The next in frequency was the ovarian, but here very often rupture took place because of the brittle character of the ovarian tissue. There was another variety of ectopic gestation which went to term, but which was the rarest of all, and that was in cases of tubal rupture, or tubo-ovarian pregnancy, rupture took place sufficiently to permit the amniotic sac with the decidua reflexa, which was formed under these circumstances, to escape into the abdominal cavity. Here the placenta continued to grow within the tube or ovary, as the case might be. Sometimes it made its way outside of the structures and implanted itself upon the pelvic wall. Occasionally it happened that the membranes were broken because of the movements of the fetus, and then the fetus was found free in the abdominal cavity. While this was an exceedingly rare occurrence, still it had been observed.

Dr. Ernst Jonas, of St. Louis, reported a case that was operated upon by Dr. Tuholske, he assisting him at the time, where in the second month of pregnancy the whole ovum was swept away from its seat of implantation in the right tube into the free abdominal cavity; implanted itself in the region of the liver, changed the liver tissue, the peritoneum covering the kidney, and parietal peritoneum to such a degree that it was able to change these tissues to true decidual tissue. The pregnancy went on to full term, and the child was removed at the end of pregnancy alive. The mother, however, died twelve hours after the operation. Why she died, they did not know.

The specimen which they had in their possession showed that it would have been absolutely impossible to have removed the placenta by force from these organs. There was no contractile tissue around it which would have led to stoppage of the bleeding.

Dr. A. B. Miller, of Syracuse, N. Y., stated that in the pathological museum at Syracuse a specimen of an ovary had been recently placed, which contained an ovum of perhaps two months' development. The patient was operated on by a neighboring surgeon, who supposed that he was dealing with an ovarian cyst. The patient came complaining of more or less pain, and on examination a small globular mass was found in the pelvis. Without taking a history of the case as to the possibility of its being a pregnancy, the patient was operated on, the ovary removed, and found to contain this small embryo. Its appearance on inspection was that of a bur within an oyster or cameo setting.

Dr. Robert T. Morris, of New York, asked whether obstetricians did not make a mistake in removing the placenta in these cases. He said the peritoneum would digest beef-steak, and there was no necessity for removing the placenta. He recalled one case in which the placenta was left for three months without doing any harm whatsoever.

A STUDY OF FOUR HUNDRED AND FORTY OPERATIONS ON THE APPENDIX WITH REMARKS.[1]

BY

EDWARD J. ILL.,

Newark, N. J.

(With two illustrations.)

The work herewith reported is the writer's personal experience.[2] It is the writer's habit to look over the histories of his cases now and then, to study up some particular subject and to learn the results both immediate and remote. If written histories are not studied, one gets impressions as to results which are often widely at variance with the true condition of affairs.

To-day I wish to present to you the result of my work on the appendix. It is my first offense for I have neither written nor said a word on the appendix before. So much has been said and written on the appendix that I rather hesitated to bring this matter before you. No small amount of good work on the subject has been developed by Fellows of this Association and published in our transactions. I would dare say that what cannot be found in our transactions is not of great value.

I have, nevertheless, asked your indulgence especially as we have much to learn and our death rate is still high. It is high for the chief reason of late operations on neglected cases. If only the diagnosis were made earlier and the hypodermic syringe were less in evidence, how much better our results would be. All this is a discouraging feature of my work.

Conditions necessitating work on the appendix presented themselves 440 times up to March 30, 1909. Of these 40 per cent. were males and 60 per cent. females. Females probably predominated because my work is mostly among women; for it was in eighty-one women that the appendix was incidently removed when other surgical conditions prevailed and the appendix looked diseased. I never agreed to the idea that because the abdomen was opened the appendix should also be removed.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

[2] His own work with that of Dr. Charles L. Ill and their combined assistants comprise several times the number of cases herewith reported.

It is my strong belief and conviction that whatever work is done, should be done simply to remove the cause producing the symptoms or disease for which the patient seeks our advice. Thus, I have rarely removed the appendix unless I thought it presented a condition of disease. I am sorry to say, however, that I have occasionally been mistaken, for the pathologist would now and then report a normal appendix. I know of little use physiologically of the appendix and for that reason see no objection to its removal. What I do know, however, is that any prolongation of the operation adds to the patient's danger and certainly to his discomfort during convalescence.

The youngest person operated on was five years old and the oldest one was sixty-five years. The nonsuppurating cases presented 57 per cent. of all cases while 43 per cent. were suppurating. Of the 189 septic cases there was a localized abscess in 109 cases and diffuse suppurative peritonitis in seventy cases. What seemed to be a general peritonitis was recorded in eight cases and two cases had septicemia.

The total number of deaths in all cases was thirty-two or 7.2 per cent. Increased experience shows a marked reduction in the death rate. Thus in the first 100 it was 18 per cent.; second 100, 6 per cent.; third 100, 5 per cent.; fourth 100, 3 per cent.

The total number of deaths in the nonsuppurating cases was two or 0.8 per cent. In one case it was an acute Bright's in a male following a chronic condition at sixty-five years that killed the patient. In another it was a paralytic ileus which resulted fatally in a male on the third day. This patient had not been prepared properly for the operation as regards his diet and bowels and was the victim of an epidemic, which prevailed with a limited few who believed that abdominal cases needed no preparation for operation.

The total number of deaths in the suppurative cases was thirty or 14.3 per cent. This number might have been reduced to a marked extent if I had refused the hopeless cases. Often it was simply a demonstration to show the attendant his fault in letting a patient go to a last chance.

An important factor in the death rate is the personal one in the after-treatment. Thus in 193 cases that were looked after personally by myself, the death rate was but 3.6 per cent., while in 185 cases looked after by the attendant physician the death rate was 10.3 per cent. or nearly three times as great. It is likely, however, that there were many especially bad cases among the latter.

The thirty deaths showed the following causes:

Local abscess	4
Diffuse suppurative peritonitis	8
Chronic nephritis	1
Perforative appendicitis	3
General peritonitis	10
Septicemia	2
Paralytic ileus	1
Septic pneumonia	1

The death rate shows but 10 per cent. of the cases of diffuse suppurative peritonitis, a result very gratifying to the operator. This however is all introductory to the remarks I wish to make. No experience is so good as one's own. It will be of interest to note the results as they can be reached, not from the masters in the art but from the hospitals generally, as we see them all over the country.

Dr. W. D. Minningham was kind enough to collect for me from various hospital reports throughout the country 7,683 cases of operation for appendicitis. The total percentage of deaths was 8.2 per cent. The death rate from non-suppurating cases was 3.7 per cent. The suppurating cases showed a death rate of 26 per cent.

The classification was given in the various reports as follows:

NON-SUPPURATIVE.

Acute	4,565;	died, 203	3.7 per cent.
Chronic	1,380;	died, 8	
Associated with other conditions	156;	died, 17	

SUPPURATIVE.

Local abscess	820;	died, 102	—12.4 per cent.
Diffuse suppurative	204;	died, 101	—49 per cent.
Gangrenous	254;	died, 50	—20 per cent.
Perforative	86;	died, 11	—13 per cent.
General peritonitis	218;	died, 141	—67 per cent.

The total number of reports received was 164. Of this number sixty-five reports were not available for use, since they were ambiguous, the diagnosis poorly stated or the result not apparent. Such cases were reported to the number of 4,112, really making a total of 11,795.

I wish to express herewith my thanks to Dr. Minningham for the labor he has bestowed on these reports as well as his work in behalf of my own records.

It will be important to note that I have never been obliged to reopen the abdomen for late symptoms or adhesions. You will remember that these are said to be of common occurrence. I state this because we commonly hear of this being done. Thus one of our most honored and learned fellows recommends an especially prepared membrane to cover the peritoneum in these cases.

There were two cases however that needed operation. One was a fecal fistula with a hernia and the other was followed by a hernia. Both cases had been sick with sepsis many weeks before they recovered. Whether there were other hernias I do not know. There could not be many since all drainage cases were urged to return in six months or one year for inspection.

So much has been written concerning the operation and its technic that I hardly dare go into that and still my remarks would be incomplete without it. We all agree that an operation cannot be done too early. Nothing is gained by waiting and everything may be lost. Most of the deaths are attributable to late and neglected cases. I have never been sorry to have operated early but many times not to have had a chance at earlier cases. We have been told again and again that a quick operation is of great importance. To this we must all acquiesce. Nevertheless, I am anxious to remove the appendix and search for a concretion from the ruptured appendix whenever that can be done within reasonable time. It all depends on the condition of the patient, however, and at times we should refrain entirely. I have seen many a case where the wound would not close because of the retention of a fecal concretion. In the search for the appendix one should be guided more by the insertion of the ileum into the colon than by the long white bands of the caput, always remembering that the near end of the appendix is within 2 cm. of the insertion of the ileum.

In all septic cases the suture material for the bowel should be absorbable. I regret very much that many surgeons are returning to such non-absorbable material as linen thread. I regard it as purely a matter of personal convenience. While I would not hesitate to use non-absorbable material in clean cases, I must certainly object to its use in septic cases, because of the formation of fistulous tracts both fecal and otherwise. It is only the finest catgut commensurable with its tensile strength that should be used for the bowel suture and it should be slightly chromicized. The ligature of the mesentery should be of plain catgut.

The treatment of the stump is important. I prefer the removal of the appendix with the cautery above the ligature. After a visit to a prominent surgical clinic we refrained from this, simply using a clamp and suture, but soon returned to our former method when we found blood in the stools of two cases, and a hematoma in a third case. The use of the cautery is more circumstantial than the application of carbolic acid but its disinfecting quality is more potent. It is difficult to understand how carbolic acid can penetrate into the convolutions of the mucous membrane. I am told of the good results of simply dropping the stump. I have no personal experience in this respect and much prefer a clean and smooth peritoneum such as can be obtained only by suture, either purse-string or interrupted. I have never seen any complication which might have been the result of such treatment of the stump.

As to drainage every one's experience is his best guide. Now and then a cigaret drain has served me well. In the real bad cases, however, I much prefer to spread some iodoform gauze loosely on the outer side of the caput coli, while the wound of the bowel is protected by a thin piece of rubber dam. With these precautions I can truly say that bowel fistulæ are an almost unknown factor in our experience. I can record but a single case which needed operation later on, and that one was a patient with a large slough in the head of the colon, the disease having lasted ten days and the patient being septic.

It is the after-treatment in the septic cases that I want to call your attention to. During the last five years I have adopted a right lateral semiprone or modified Sims's posture in all drainage cases. The quantity of fluid thus drained from the abdomen is often truly wonderful and there is also a marked improvement in the pulse, temperature, and general appearance over the former methods of drainage. The posture has the effect of bringing the opening made into the peritoneum to the lowest position of the cavity and thus drain very completely. This will be easily understood since it is more likely that fluid will flow downward more readily than upward, even though the latter may be under positive pressure of the abdominal contents. The drain, whether it be a cigaret or open gauze drain can be brought out through the upper end of the incision where the muscles and the abdominal pressure are least, and thus secure a condition which rarely produces a hernial protrusion. Secondary or loin incisions are thus entirely uncalled for, for the purpose of drainage.

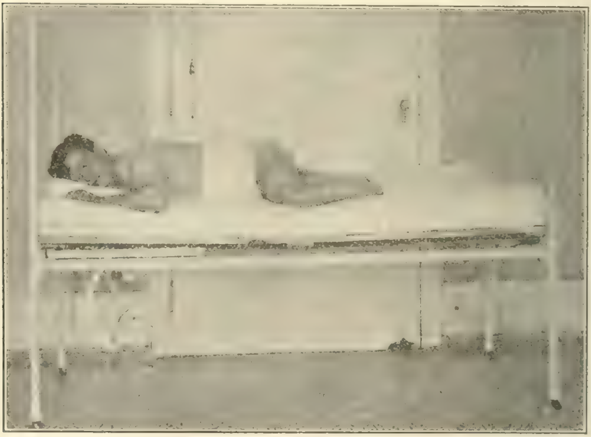

FIG. 1.—Proper posture.

This posture may be described in the following way: the bed selected should have a good mattress on a stiff spring. When such a spring cannot be obtained a lap board should be placed under the mattress midway in the bed. In putting the patient into the bed he is placed flat on his back well beyond the middle of the mattress. The left thigh is flexed at right angles to the body and the bent right elbow pushed alongside of the chest to remain either behind or in front of the patient as may be most comfortable. The patient is then rolled over on his right side until the wound is flat on the bed, the left thigh remaining at a right angle to the body. A very small pillow under the right side of the head will add to the comfort of the patient. The accompanying photographs will explain the position better than words. It is quite important that the bed be an unyielding one. There is little complaint from the patient because of the posture. At the end of twenty-four hours, that is, with the change of the first dressing the patient is turned on his back, for at the end of that time everything is walled off. As has already been said the amount of fluid drained off during the first twenty-four hours is often amazingly large. A further advantage of the posture is the ease with which normal saline solutions may be injected into the rectum. The introduction of the fluid is much favored by this posture since it will naturally gravitate upward.

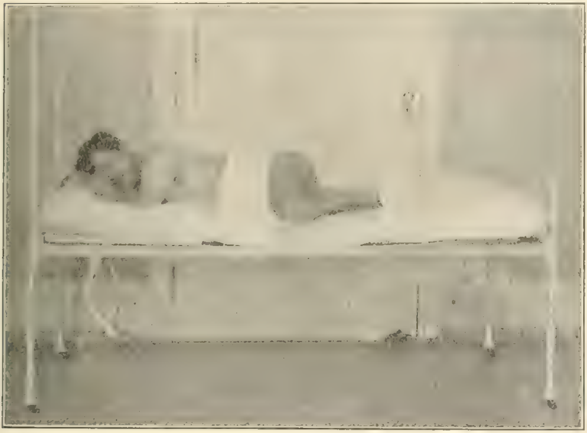

FIG. 2.—Improper posture.

I speak of this since we all agree as to the apparent advantage of rectal saline infusion. The wound should be kept scrupulously clean, while the dressing should be changed every twenty-four hours. Whenever the gauze is used either *en masse* or as a cigaret drain I am anxious to have it kept wet. Wet gauze will continue to act as a drain while dry gauze will dam up the discharges. It is therefore my custom to place a compress soaked in a 1 per cent. solution of carbolic acid over the wound. Over the compress I order a piece of rubber tissue. This keeps the compress wet. The nurse changes the compresses as often as it is necessary to keep the parts clean, that is, about once in four hours. When the drain has once been removed no further packing is ever done. This constant packing of the wound is not only exceedingly annoying and painful to the patient, but lengthens the period of convalescence and keeps up a running temperature. I have many times heard my assistants say that our own ward patients recover quicker and easier than those of my colleagues who insist upon repacking the wound.

1002 Broad Street.

THE NEW POINT IN DIAGNOSIS BETWEEN APPENDICITIS AND TUBAL DISEASES.[1]

BY
ROBERT T. MORRIS, M. D.,
New York.
Professor of Surgery in the New York Post-Graduate Medical School.

For more than a year I have been calling attention to a diagnostic point which is of value in differentiating between appendix trouble and diseases of the adnexæ. The question has been taken up by a number of different writers, who have given me suggestions of much value, and I can perhaps answer some of these questions to-day to advantage for the members of this Association. The point, as you will remember, is this: about an inch and a half to the right of the navel close down to the spinal column we find the right group of lumbar ganglia. Hypersensitiveness on deep pressure at this point seems to indicate that the appendix alone is the seat of irritation. When the left group of lumbar ganglia an inch and a half to the left of the navel also shows hypersensitiveness, then we are to look to the pelvis for the source of irritation. A number of men have said that I must be wrong about the structures involved. They believe that we are not dealing with the lumbar ganglia, but with the lymphatics instead. My answer is this: it was my own original belief that we were dealing with sensitive lymph nodes and lymph chains, but my reason for deciding that we were dealing with sympathetic nerve ganglia was that we found the greatest degree of hypersensitiveness and the greatest importance of this diagnostic sign in cases in which there was no infection whatsoever; in other words, in cases of what I call protective appendicitis.

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[1] Read at the Twenty-seocnd Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

We must divide our cases of appendicitis to-day, for the purpose of classification, into at least four kinds. First, protective appendicitis, the commonest type. These are patients who go the rounds of visiting doctor after doctor asking if they have or have not appendicitis, and if they see a sufficient number of doctors they obtain in the end a sufficient number of opinions. They are the cases in which the patient is never going to have appendicitis of the infective character. Such a patient is protected against it, and for two reasons. First, because the structures susceptible to infection are removed by the degenerative process called by Senn appendicitis obliterans, and by Ribbert normal involution of the appendix. The structures susceptible of infection are being removed hour by hour, day by day, month by month, and year by year in these cases. And another reason why these cases are not going on to infective lesions is because of the constant irritation of nerve filaments entrapped in the sclerotic fibers leading nature to call out a persistent hyperleukocytosis, local in character and protective.

These cases may be classified as cases of protective appendicitis. They form the largest number of appendicitis cases that we have in the whole world at the present moment. It is in precisely this class of cases that the diagnostic point is of the greatest value. The patients who go the rounds of the profession with the appendix in the shape of a question mark may have tubal disease, and often the question of many other conditions comes up; but if you press on that point an inch and a half to the right of the navel, and deeply, you press the button which turns on the light. In cases of tubal disease both groups of lumbar ganglia are hypersensitive, but in cases of appendix trouble the right group only.

The second most common cases are those of intrinsic infective appendicitis. Those are the cases which attract our attention more frequently at the present moment, because they represent the yellow journalism of appendicitis. The features are all in evidence on the front page in large red type. These are, next to the cases of protective appendicitis, the most common. In them the diagnostic point, which I have tried to bring out, is of small value. Why? Because we have other points of so much greater value. It is often present and often obscured by the dominance of more important signs which are recognized to-day.

Therefore, in the second group of cases, McBurney's point is one of great diagnostic value, and the point to which I call your attention is of fourth rate importance.

The third most common group is perhaps the cases of syn-congestive appendicitis, where we have serous infiltrates in the tissues synchronously with serous infiltrates in the vicinity, and the appendix is incidentally tense from the infiltrates. In cases of loose kidney we often find this condition. Also, in cases of abdominal ascites, rheumatism and in cases of various kinds of obstruction to the lymph and blood circulatory currents, we will find cases of syn-congestive appendicitis. These also are protective against infective changes. The appendix is found on pressure, to be more sensitive than normal, and the patients have symptoms of irritation in the appendix region, and in these cases again we find this diagnostic point of some value, but not of great value.

The fourth class consists of cases of appendicitis with extrinsic infection in which the infection proceeds from the oviduct, peritoneum, or some neighboring structure, and so slowly that we do not have the incident of rapid swelling that occurs with intrinsic infection in which we have a rapid compression anemia, due to swelling of the soft inner coats within the tight outer sheath. In the attack of compression anemia, the tissues are made temporarily vulnerable to attack by bowel bacteria. In the cases of extrinsic infection, however, the appendix shows slow tissue changes, and a protective leukocytosis goes on in such a way that we do not frequently have to deal with the accidents belonging to intrinsic infection. In this class of cases the diagnostic point to which I call your attention is not of great value, because the appendix feature is very apt to be associated with pelvic trouble; therefore, we are apt to have both groups of lumbar ganglia hypersensitive.

The thought I wish to make essential is this, that this diagnostic point is of greatest value in the commonest class of cases of appendicitis—namely, protective appendicitis, and in the class of cases in which there is most often a question if we have disease of the oviducts or of other structures. In some cases of appendicitis with intrinsic infection, the diagnostic point has been of value when this type of appendicitis has been actually associated with tubal disease. Twice during the past year physicians have said to me, "here is a patient who has pelvic disease, but also appendicitis." I have said to them, "why have you so decided?" "By knowing the point to which you call attention"—they answered, "both groups of lumbar ganglia are hypersensitive, but there is a greater degree of hypersensitiveness on the right side." Twice physicians during the past year have made diagnoses of appendicitis in conjunction with tubal disease, because of a greater degree of hypersensitiveness of the right lumbar ganglia.

How are we to rule out hysterical sensitiveness of the abdomen? By the superficial character of the sensitiveness on pressure at this point. Will a hernia on the right side cause hypersensitiveness at this point, exclusively? That is a matter which I have not quite determined yet. With reference to this feature I have examined a fairly large number of cases of hernia. In cases where the hernia was causing acute symptoms, there has been a good deal of local sensitiveness, both superficial and deep, but we did not need that diagnostic point, because the other features were sufficiently in evidence. In cases in which the hernia was not causing any acute disturbance, there was no sensitiveness of the right group of lumbar ganglia. In cases in which the source of irritation is above the level of the navel, I put negative value on this point. In cases of loose kidney, with congestion of the appendix, this point does not furnish evidence of any great value, because we have the better testimony of the loose kidney.

In cases of pneumonia, where there has been a question of diagnosis, of what value is this diagnostic point? I do not know. I would like to know. I have not seen during the past two years a case of pneumonia in which I could bring out this point; but a good many cases of pneumonia are operated on every year for appendicitis, and I would ask the members of the Association to bear this in mind and find out what value this point is in cases of pneumonia.

In cases of gallstones, I have not found hypersensitiveness on either side of either group of lumbar ganglia of value. This is also true of ulcer of the stomach. In one case, where it was a question if a patient did not have chronic ulcer of the stomach, I found both groups of lumbar ganglia hypersensitive, and going to the pelvis for the source of the trouble I found that he had tuberculosis of the left seminal vesicle, and his dyspepsia disappeared on the removal of the left seminal vesicle. The man was sent to me, however, with the question of operation for ulcer of the stomach.

In cases of malignant disease of the cecum or sigmoid, we would naturally expect to find that the right group of lumbar ganglia, or the left group of lumbar ganglia, was hypersensitive on pressure. In cases of malignant disease, for some peculiar reason, for which I at present have no explanation, this point is of no diagnostic value.

616 Madison Avenue.

DISCUSSION.

Dr. James F. Baldwin, of Columbus, Ohio, stated that in the three years preceding the current year, he had done six hundred and fifteen operations for appendicitis. Of this number, over four hundred were chronic cases, with no mortality. In another series of suppurative and gangrenous cases of appendicitis, called in Chicago general purulent peritonitis from appendicitis, the mortality was small.

He had been watching during the last year or two for Dr. Morris's diagnostic point, and in a number of cases he had found it of decided value. In some others it apparently had been deceitful, possibly because the speaker was not sufficiently expert in bringing it out, but it was a point for which he was constantly on the lookout.

Only a couple of days ago he operated on a woman who presented in the history which he got from her and her physician a very typical case of appendicitis of some weeks' duration, the chronic type, doing no special harm, but a source of anxiety, and owing to continued tenderness over the appendix she was confined to bed during that time for several days. There was distinct pain, but not marked. In making a vaginal examination there was found to be considerable tenderness over the tube, and he felt a lump there, which was somewhat tender, and it was a question whether he did not have tubal trouble to deal with. He inquired as to menstruation, and found that the last period, a week before, was normal. Explaining the matter to her physician, he made a median incision so as to be able to reach the appendix and also the appendages. He found the appendix congested, but not more so than in a great many cases in which there was no distinct history, but very much to his surprise he found a tubal pregnancy just leaking a little.

Dr. J. Henry Carstens, of Detroit, said the paper of Dr. Ill was characterized by good common sense. There were one or two points worthy of emphasis. The idea of removing the appendix when the abdomen was opened for the relief of some other pathological condition was a bad one. It was bad doctrine to teach, particularly if there was no reason for removing the appendix. He endorsed the point about using silk ligatures. He did not see how any surgeon who called himself up-to-date could use silk for anything except intestinal surgery. Catgut was good enough. It could be rendered sterile, and there was no excuse for using anything else in cases of suppurative appendicitis.

DR. MORRIS I. ROSENTHAL, of Fort Wayne, said he believed the use of catgut in appendicitis operations for the ligation of the appendix had brought good operators and great surgeons to the conclusion that the removal of the healthy appendix was much more dangerous than the removal of the diseased organ. He had heard this statement made by men of large experience, and since some of these surgeons were using catgut for ligating the appendix, he thought it was the catgut which was at the bottom of the increased danger. He had done over one thousand appendectomies. He had not removed an appendix that did not look to be pathological. So far as lumbar drainage was concerned, it was a good method in those cases where one did not wish to subject the patient to the danger of hernia.

DR. ERNST JONAS, of St. Louis, mentioned the case of a boy upon whom he operated for the removal of the appendix, but who had right lobar pneumonia. One of the most prominent diagnosticians in St. Louis, an extremely careful man, called the speaker one evening to the University clinic, and said that during the afternoon he had seen a boy, eleven years of age, who undoubtedly had a perforation of the appendix. He went there, and got a history to the effect that the boy was taken sick suddenly with pain all over the abdomen, followed by nausea and vomiting; then the pain became localized in the region of the appendix, with rigidity of the abdomen. A diagnosis of perforation of the appendix was made by the physician. The speaker examined the boy's abdomen carefully and found absence of the sensitive spot to which Dr. Morris had called attention. He operated and found what he considered was a normal appendix. He said to the physician that the boy would have to be examined for some other affection. Accordingly, he was afterward carefully examined and found to have a right-sided lobar pneumonia.

DR. ALBERT GOLDSPOHN, of Chicago, said, with reference to the diagnosis between tubal or ovarian disease and appendicitis, this was a serious and very important matter. We ought not to operate for tubal or ovarian disease in the acute state. We had no business to operate until nature was given a chance to subdue the inflammation in these parts, and if this were done there would be less operating, and the patients would be given greater benefit if we waited until the acute condition had subsided. This was correct doctrine in regard to infection so far as it pertained to the genital organs. With regard to appendicitis, he thought it was our duty to remove the appendix as soon as the diagnosis was made.

DR. ALEXANDER HUGH FERGUSON, of Chicago, said the subject of appendicitis was always with us. He had laid down certain rules for himself as to *when* and *when not* to remove the appendix after opening the abdomen for other purposes. In the first place, if he should get a case with a history of attacks of appendicitis, he would not hesitate to remove the appendix. When the appendix was cord-like or constricted, or when it was bound down so that it was liable to be constricted more and more, his rule was to remove it. It was an exception to leave such an appendix. On the other hand, if there had not been a history or suspicion of trouble in the appendix, and it appeared and felt normal, and he had plenty of other work to do on that patient, then he would leave it alone. The appendix could be left alone if the appendicitis was secondary to tubal trouble, because the inside of the appendix might not be inflamed, but it might be inflamed from without. Its lumen was safe so far as the patient was concerned. If he had a great deal of work to do in the pelvis, he let the appendix alone, as it was safer for the patient to do an operation at another time, should it become necessary.

PHLEGMASIA ALBA DOLENS IN CONNECTION WITH OVARIAN TUMOR.

BY
WILLIAM A. B. SELLMAN, M. D.,
Baltimore, Md.

(With three illustrations.)

I WAS called to see Mrs. H., March 14, 1909, by Dr. John H. Rehberger of this city. He informed me that his patient was thirty-two years of age; had been married twice and never pregnant. Menstruation had been regular and not attended by any special derangement. She complained of intense pain in her left leg from the hips down; she had no suspicion of the existence of a tumor. The left limb had been swollen for some months and the pain was increasing. She was unable to sleep at night and was made generally miserable by the condition existing. I made a thorough examination and found the abdomen very much distended especially upon the left side and I immediately made a diagnosis of ovarian tumor. There was fluctuation in the growth. I advised immediate operation and she entered the Biedler and Sellman Sanatorium March 20, 1909.

March 23, 1909, the patient was placed under ether anesthesia and the tumor removed. The incision was made in the median line and the tumor was easily exposed. It was found to be multilocular and the larger cavities were emptied by use of trocar. About thirty-two pounds of fluid was contained in the tumor. The sac weighed twelve pounds and the left ovary was removed with it: the pedicle was ligated, then cut and the stump stitched

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

into the broad ligament. The abdominal wound was completely closed by means of catgut sutures. The patient convalesced uneventfully and was allowed out of bed at the termination of two weeks and went home at the end of three weeks. At time of leaving the sanatorium the limb was reduced almost to the normal size and her attending physician tells me that the swelling subsided completely by the end of two months after the operation was performed and that she is at present enjoying perfect health.

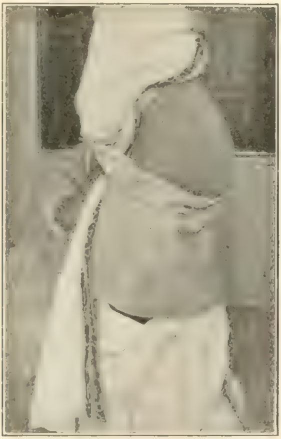

Fig. 1.

I present photographs showing the size of the tumor including views from the side and in front: the amount of abdominal distention is clearly shown. The third photograph shows the size of the swollen limb. It presented the characteristic appearance (white glazed) of a case of phlegmasia dolens and the skin was distended almost to bursting. I could not trace the femoral vein from the groin as it courses down the thigh; it did not impart that sensation of hardness and it did not roll under the finger like a cord as described by some authorities. On this account I decided that there did not exist infection nor inflammation of the venous trunks. The pain was increased by extension of the limb. There were some varicosities in the veins from the groin down to the ankle.

Dr. J. Whitridge Williams tells us in the last edition of his text-book upon Obstetrics (page 865) "Phlegmasia alba dolens as a rule results from the extension of a thrombolic process from the pelvic veins; and in several cases could be traced from the uterus to the common iliac vein, whence it extended upward to the vena cava and downward to the vessels of the foot. Occasionally in cases which recover, the phlegmasia appears to be an isolated process, though it is probably only a part of a much more extensive thrombosis. Moreover it should be borne in mind that even widespread thrombosis may give rise to but slight clinical manifestations, as in one case where the femoral vein and all of its branches were occluded completely, though careful mensuration was necessary to detect any difference in the size of the legs. Another case showed complete occlusion of the common iliac, and the femoral veins, which was clearly the result of pressure."

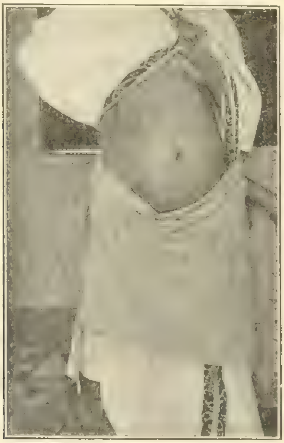

FIG. 2.

Our patient did not present the symptoms of one suffering from "phlegmasia alba dolens puerperæ." She failed to have the elevated temperature which I have found present in cases of this character; but there existed the interference with locomotion due to the weight and size of the limb. She did not have the gastric disturbances, anorexia, bad taste, coated tongue nor eructations but she was constipated. The urine was highly colored but no albumin nor tube-casts were present.

In conclusion I will state that I considered the phlegmasia dolens was due in this case to pressure upon the iliac vessels on the left side and that this pressure was immediately relieved by removal of tumor. The patient was fortunate in the rapid restoration of the circulation and in not having had a clot form which might have destroyed her life by the entire clot or a portion passing to the heart.

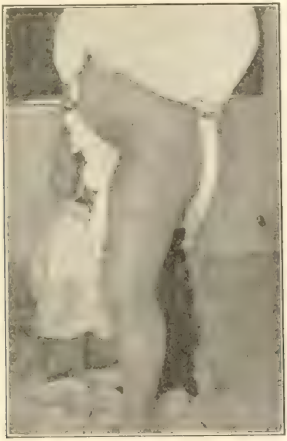

FIG. 3.

5 EAST BIDDLE STREET.

DISCUSSION.

DR. WALTER B. DORSETT, of St. Louis, said he had been unfortunate in a number of instances, after the most careful procedure, so far as asepsis was concerned, in having the disagreeable symptoms of phlegmasia alba dolens occur in the left thigh. He had had some four or five cases in which this condition occurred following the removal of fibroid tumors, and it did not seem to make any difference whether the tumors were large or small. It was naturally supposed that large-sized tumors would produce more pressure symptoms than small ones. Fortunately, all of these patients had recovered, and had had no trouble whatever afterward, after the usual treatment, such as elevation of the limb in a Hodgen splint, and tonic treatment, iron, quinine, and strychnia. So far as swelling was concerned, he had seen it occur from any tumor, whether it was a fibroid or ovarian tumor, and it was simply the pressure that produced the symptoms. He did not think the case reported by Dr. Sellman was one of phlegmasia alba dolens, pure and simple, and if the patient's condition had not been as good as it was, the possibilities were that there might have been sepsis following the phlegmasia.

Dr. Albert Goldspohn, of Chicago, recalled two patients upon whom he had recently operated who developed this postoperative condition, one about twelve days after operation, and the other fourteen days. It was in the nature of a phlebitis. Such experiences as these he had had several other times in years gone by, but these disturbances had never been of a serious nature, and not so serious, so far as local manifestations were concerned, nor so prolonged in time required for recovery, as was the average phlegmasia alba dolens following the puerperal state.

Dr. Thomas B. Noble, of Indianapolis, believed that certain individuals presented angiomatous pathology which was not seen in other individuals; out of this we had purpura hemorrhagica, also angioneurotic edema and their analogues, so that it was more reasonable to believe that there was a dyscrasia, a disposition toward a venous pathology by nature in some individuals. Everyone who had to deal with any sort of abdominal surgery ran across unexplained pathology of the veins. All had had such experiences as had been related, where, without cause, after perfectly clean operations, apparently strong individuals had developed this condition following a suspension of the uterus, an appendectomy, or some minor abdominal operation.

To carry out this idea of dyscrasia, recently a young attorney, who had lived a moderate, hygienic life, had been perfectly healthy and well during his life, was stricken with phlebitis during the course of a trial in court which was confined to the right leg, but in course of time he recovered. Within two weeks thereafter the condition appeared in the left leg, extending to the thigh; the edema finally went as high as the armpit, and it seemed as if this condition would be established in the entire left leg. This was followed by a thrombosis, embolism, and a sequential pathological condition from such an embolism in the lung. After a long period of illness resultant from this complication the man recovered. But a year later a peculiar and obscure abdominal condition arose attended by pain, directly followed by the vomiting of a large quantity of blood from which he died. Autopsy showed that there were infarctous changes in quite a number of feet of the intestine from the duodenum down, which was perfectly black, and a terrific reflux of blood coming into the infarctous area was followed by a pronounced hemorrhagic exudate in the lumen of the intestine, which was carried up into the stomach and vomited up as red coagulable blood. This man had sound lungs. He was never syphilitic, and there was nothing in his life or history which would account for the disposition on his part to develop this venous change, so that the speaker could not help but feel that in some individuals there was an unknown quantity, an unknown indefinable something which predisposed them to a venous pathological change, and that we could not anticipate it; that it might occur and even dire results follow minor operations in cases which otherwise ought to present a very favorable prognosis.

Dr. H. W. Longyear, of Detroit, said the remarks of the last speaker were very pertinent regarding phlebitis or phlegmasia alba dolens. He did not think we needed to look for any local irritation in the region of the vein affected, but the vein affected would account for the condition. We might operate on one side of the body, and healing would occur without any trouble whatever, yet phlebitis might occur on the other side without any apparent cause. He had known that condition to occur in two or three instances, one of them being simply a fixation operation. The wound healed immediately; there was no trouble from it thereafter; but the patient in two weeks had pain in the lower left quadrant of the abdomen; in a day or two that side was sore and tender to the touch, and she developed a mild phlebitis. This subsided and she got entirely well, was about to get up, when the other side became similarly affected. He had seen this occur following operations where there had not been any suppurative disease, so that it seemed to him, as the preceding speaker had said, there must be some dyscrasia to account for this rather than any infection from the operation itself. In regard to the case reported by Dr. Sellman, he thought the trouble must have been due to pressure rather than inflammatory action.

Dr. E. Gustav Zinke, of Cincinnati, said in Dr. Sellman's case there was swelling of the left leg, with a large multilocular ovarian cyst, the removal of which resulted in an immediate cure. If he understood the meaning of phlegmasia alba dolens, it meant an inflammatory condition usually of septic origin. There was no elevation of temperature at any time either prior to, during, or after the operation, and he had some doubt as to whether this was in reality a case of phlegmasia alba dolens. It looked to him as though there was a temporary obstruction of the circulation which caused the swelling of the leg, and with the removal of the pressure upon the bloodvessels the swelling disappeared. Had this condition occurred after the operation, with elevation of temperature, etc., the speaker would have no doubt whatever as to its real nature, but he could readily understand how swelling of the extremities, either or both, might occur on account of the presence of a large multilocular ovarian cyst when it occupied so much space in the pelvic cavity.

Dr. John W. Keefe, of Providence, said that post-operative phlebitis was a distinct condition from that described by Dr. Sellman. As to the cause of postoperative phlebitis, we were as much in the dark to-day as we were twenty years ago. Much thought and study and a great deal of theorizing had been indulged in in reference to the cause, and yet it appeared to him that nothing had been definitely determined as to the exact cause of postoperative phlebitis.

He recalled a case of inguinal hernia in a woman where the operation was perfectly simple. The wound healed by primary union, and in ten days she developed phlebitis in the left leg. About twelve days afterward she developed phlebitis in the right leg. There were no signs of sepsis at any period. She gradually convalesced from the phlebitis. It occurred to the speaker that the case of Dr. Sellman was not one of phlegmasia alba dolens, but phlebitis due to pressure from the large tumor.

Dr. Sellman, in closing the discussion, remarked that what the last two speakers had said had accomplished the object of his paper. He was in doubt himself about the diagnosis of phlegmasia alba dolens. His experience had been that all of his other cases of phlegmasia alba dolens had been postoperative or postpuerperal following dangerous and difficult and almost always mechanical deliveries. The very reason he presented the paper was to find out what the condition really was.

SOME PHASES OF PUERPERAL SEPSIS.[1]

REPORT OF A CASE OF PUERPERAL PERITONITIS; OPERATION WITH RECOVERY.

BY

HUGO O. PANTZER, M. D.,
Indianapolis.

Recent literature teems with articles on puerperal sepsis: "Solving the Problem of Obstetrics," as reads Zinke's title of a forceful demand for better midwifery. The unabated morbidity and mortality attending on obstetric cases in private homes, stands a lone vestige of the past. The boon of antisepsis and asepsis, as brought to bear on these cases when confined in hospitals, has reduced the maternal morbidity and mortality to the low percentage achieved in all other branches of surgery. The multiple traumata more or less invariably inflicted upon the maternal parts involved in childbearing, makes this practice essentially a surgical one. The rigid demands of modern surgery must find application here. The hospital movement of modern times will not have achieved its acme, until these cases are provided for. In all other specialties, cases having a surgical import are being insistently taken to the properly appointed hospital.

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[1] Read at the Twenty-second Annual Meeting of the American Association of Obstetricians and Gynecologists at Fort Wayne, September 21–23, 1909.

The relative disavowal of midwifery by those seeking a specialty, has left this paramount branch of medicine without the ardent espousal and beneficent activity that has characterized the recent growth and usefulness of all other divisions of medicine. The long, uncertain hours, the troublesome course of these cases, their interference with the practice of other kinds of cases, make this part of the practice undesirable, not to say loathsome to the general practitioner, to whom now falls the vast majority of these cases. What is not essayed with love and intentness, goes by default! As negative testimony of this result stands the sparse contribution to the literature of this subject by general practitioners. Let it become the rule that these cases are taken to hospitals. Create maternity hospitals in every community, and at once the situation will change. The better results obtainable by the surgical cleanliness of the hospital appointments, the trained and supervised nursing provided there, but more, the practical assistance and proxy always present in the case of an acute emergency in the persons of the hospital internes, will take from the practice of midwifery the features that go to make it unsought and abhorred.

This change, too, might make feasible again the specialty of joint obstetrics and gynecology. This oldtime natural and efficient association has constantly prevailed abroad where obstetric science has made its greatest advances. The present strenuous endeavor to bring medical education under state control and provision; in essence the incorporation of the medical colleges into the state or founded universities, will eventuate in the ultimate provision of proper hospital equipment and salaried professorships for all our colleges. This will make practicable the reassociation of the two branches in one chair. It is unnecessary here to state where the skill and daily experience of the gynecologist particularly dovetail into the needs of practical midwifery.

By present arrangement, what occurs when an obstetrical emergency arises? The practitioner in attendance calls in another general practitioner, no better informed nor skilled than himself. Reasonably enough, the gynecologist, who avowedly has discarded obstetrics, is called upon fewest times, and then oftenest too late for succor to the patient. No doubt the obstetric mortality is owing much to the inavailability of obstetric consultants in our communities.

There may be grounds of expediency that will aid in the solution of this problem. The surgeon to-day is no longer observant of the domain of the genecologist, but extends his practice also to gynecologic cases. In turn it may come to pass that the gynecologist to sustain his specialty and his practice, may be driven again to take up jointly with gynecology the cause and practice of obstetrics. It may be here noted, that the parturient woman in European countries fares less well, than does the American. The practice of obstetrics there is left almost entirely with the midwife. She is less educated and prepared than is our trained nurse. At times of distress, the midwife calls into the case the general practitioner who at best has but little experience even in ordinary obstetric cases.

The writer's review of recent obstetric publications comprises some twenty articles by home and foreign writers. The recognition of a differential pathology and diagnosis; and scepticism and conservative use of remedial measures, are the dominant features of this literature.

Practische Ergebnisse der Geburtshilfe and Gynaekologie, vol. i, Part I, contains three articles of special merit to which the writer desires to refer those interested in this subject. They are: Veit—Die Uterus Extirpation bei Puerperalfieber; Fromme—Diagnosis und die Behandlung der acuten diffusen Peritonitis puerpralis; Frankl—Practische Ergebnisse der Serologie fuer die Geburtshilfe und Gynaekologie. Brief reference only to these articles and a few others shall be had here, and more particularly pertaining to puerperal peritonitis.

All kinds of pathogenic bacteria have been found in peritoneal exudates, aerobic and anaerobic, though special clinical significance attaches to the streptococcus. Bacteriologic research as yet is insufficient to make clinical differentiation possible. Infection of the endometrium with virulent streptococci at once causes depression of systemic resistance. The disease extends by the bloodvessels or by the lymph-channels, or by both courses. In extension by the bloodvessels alone, the peritoneum becomes only rarely involved, namely, when in pyemia there develops periphlebitic abscess and extension of infection to the peritoneum.

Frequent and more grave is a streptococcic infection which goes along the uterine lymph vessels, especially of the fundus. These reach the peritoneum directly. Besides peritonitis in these cases, general infection and sepsis result. Microscopic preparations plainly show streptococci streaks in broad bands throughout the uterine musculature; less frequently they are found within the bloodvessels. The muscle cells are edematous, and lie separated by round cell infiltration. The great virulence of the germs is manifest clinically in the early days of the puerperium—second, third, or fourth day—by chills, high temperature, rapid pulse, general torpor, or euphoria. The peritoneal symptoms follow within twenty-four to forty-eight hours. Uterus is found well contracted, possibly tender to pressure over its lateral margins. The lochia reveals little macroscopic change; microscopically long chains of streptococci are found. These germs possess hemolytic property.

If the infection—by streptococci or other bacteria—is less virulent, the spreading of the bacteria through the tissues is impeded, and the extension goes by way of the tubes. In some cases, the abdominal ostia of the tubes become agglutinated, or intestines lie to and become adherent. This may prevent peritoneal invasion or limit it greatly. This form of infection in most instances has revealed the diplostreptococcus of Walther, which Fromme holds is identical with the nonhemolytic streptococcus. High fever in the early days results from inflammation of the endometrium. With the involvement, later, of the tubes, the peritoneal symptoms appear, generally at the end of the first, or beginning of the second week. They may not appear until the woman is about and apparently well for some time.

A third possibility for the occurrence of peritonitis, arises from the discharge of pre-existing abscesses, as when a pyosalpinx, or a parametric abscess ruptures. Another cause for peritonitis is given when the uterus or vagina is perforated and germs have direct communication with the peritoneal cavity. In this form have been found various bacteria, namely, streptococci; gonococci associated with other germs; staphylococci; the pyocyaneus; pneumococci; and colon bacillus. The beginning of peritonitis caused by rupture of a pyosalpinx or parametric abscess into the abdomen is announced by collapse, great sharp pains, vomiting, fear, cold sweats, accelerated breathing and rapid heart's action.

The peritonitis following perforation of the vagina or uterus is of more gradual development, unless highly virulent streptococci are involved. The latter type of peritonitis is attended with less pronounced local symptoms. Pain, pressure tenderness, bloating, may be obscured by the systemic and psychic depression. The muscular rigidity and tenderness of the recti, peculiarly manifest in the type of peritonitis caused by the colon bacillus, are often not found in the streptococcus peritonitis. The abdomen often remains soft for a long while. The exudate, too, in the peritoneal cavity in this form is less obtrusive, and its presence by percussion elicited less easily. The bowels in this form retain mobility longer, shift with change of position of body. Vomiting in perforative peritonitis is immediately present. Where the process comes up slowly and develops gradually upward, vomiting and meteorism follow the progressive agglutination and paralysis of the intestines. The vomitus at first looks normal. It gets to be bilious and feculent in appearance and odor, as the bowel contents are held back a longer time and retroscend. Admixture of blood makes the vomit black and indicates septic hemolysis.

As the meteorism from intestinal paralysis and distention increases, the tympany further obscures the detection of exudates. Toxins and bacteria leave the bowel and by osmosis are taken up in the blood. In virulent streptoccus peritonitis, the meteorism and intestinal retention of contents are commonly less present; even diarrhea may prevail. The temperature, ordinarily high in peritonitis, in bad cases of streptococcus infection may be low or subnormal. Many times the rectal temperature in these cases will register high, when the oral is normal or even subnormal. The pulse is always frequent in diffuse peritonitis, not singly in relation to high temperature; it is markedly frequent from the beginning in streptococcus peritonitis, showing the immediate grave involvement of the vasomotor centers by the bacteriotoxins.

Fromme and Heynemann found serious puerperal fever invariably associated with hemolytic streptococci. Nineteen out of thirty-six cases of normal puerperia revealed streptococci in the vagina, none of which showed hemolytic property. All cases died where hemolytic streptococci were found in the blood. Fromme concludes that the hemolytic streptococci found in the vagina are not pathogenic. The hemolytic, *i.e.*, pathogenic germs are carried into the uterus from the lower vagina or from without. Heynemann admits that now and then hemolytic streptococci are found in puerperia having light fever, or no fever. However, when these are present in the blood or in peritoneal pus, the prognosis is bad. Fromme presupposes the occasional existence of hemolytic streptococci in the vagina of normal women, and he attempts differentiation between hemolytic non-virulent and hemolytic virulent streptococci by the capability of the non-virulent to grow upon red blood-corpuscles, while the virulent can not do so at all or in much less degree. Henckel disavows infections from pre-existing vaginal bacteria. Puerperal infection is owing to inocculation from vulva or lower vagina.

The invariable use of the curet in puerperal cases to assure against the retention of placental remnants, until recently almost universally taught and still much practised, has been attended with baneful consequences in many cases. Such, and similar experiences, with many remedies indiscriminately applied to a disease of variable origin and anatomical location, has naturally produced the revulsion to all kinds of therapy that is apparent in the attitude and expressions by many writers of the day. The old empirical teaching that meddlesome midwifery is noxious, receives fulsome emphasis. The broadcast application of single remedies, at a stage when fine differential diagnosis is not possible, has certainly been harmful. By the side of this a nihilism in therapy such as is declared by Mermann, is hopefully virtuous. Mermann reports seventy-three cases of puerperal infection which received practically no treatment with results as good and better than in cases where various active treatments were employed.

Watkins, in a sane and valuable paper, "The Treatment of Puerperal Infections," (AMER. JOUR. OBST. AND DISEASES OF WOMEN AND CHILDREN, September, 1909), discussed his experiences in sixty-one cases of puerperal fever. He deduces "that the systemic infection is much more important than the local infection" and "that the systemic treatment is much more important than the local treatment"—"that there is more danger of doing too much than too little"—and "that the energetic local treatment generally used is more dangerous than the infection." Watkins properly limits strictly the exploration of the uterus to cases of uterine hemorrhage and offensive uterine discharge, and abstains where there is parametric disease. He prefers packing of the vagina to promote spontaneous expulsion of retained placenta, to digital or instrumental removal of same, even where foul discharge and fever are present. In this demand he goes one point further. In cases where packing is unsuccessful in twenty-four hours, a second packing is used, irrespective of fever or pulse. Watkins refers to the cow, in whom often the placenta is retained unduly long. This becomes infected and offensive. Yet it is finally expelled spontaneously about the ninth day, seemingly without ever ending in death to the animal.

It may be questioned whether the parallel drawn is mete. If permissible, the fact warrants the deduction that at worst, a let-alone policy at all stages of obstetric practice has superiority over a course of routine therapy. The observation is suggestive of much more than can here be entertained. Watkins places his reliance in the treatment of puerperal infection largely upon the building up of increased physiologic resistance, having employed it to the exclusion of all other measures in thirty-one of his sixty-one cases. Very interesting in this report is that exudates were treated expectantly, and found in the vast majority to absorb spontaneously. One case, with extensive exudate involving the right broad ligament, tube and ovary, and the appendix, was subjected to abdominal section at a time when the disease seemed at a standstill. For fear of doing injury to the intestines, the abdomen was closed without attempting anything. The case made full recovery. Interference in these cases, before three weeks, that is, before the exudate is supposed to have become sterile, Watkins thinks, commonly makes conditions worse, resulting in secondary infection, and increased duration of illness, or death. Twice only was abdominal section done in this group of cases—namely, for intestinal obstruction and gonorrheal infection respectively. Out of six cases of suppurative peritonitis,—all fatal,—three were subjected to vaginal section. Watkins suggests that one of these might have recovered if abdominal section had been done instead of posterior colpotomy. There were no cases of septic thrombosis or pyemia encountered in this group of cases. There were altogether fifty-four recoveries and seven deaths; six of the latter having had suppurative peritonitis.

Quite in contrast with such papers, stands the relatively hopeful advocacy within the last years, of panhysterectomy for puerperal sepsis, by von Herff, and Henkel. Coming with such authority, this stand has induced Veit to give the matter critical consideration. Veit, in a most instructive revision and scientific digest of the subject, comes to quite different conclusions. "He who operates many such cases," Veit says, "in my opinion operates too often; he who has only recoveries, has operated needlessly, cases that would have recovered without; and he who can report only deaths, could have predicted this result before operating."

Veit puts stress on the important bearing the different kinds of fever-producing bacteria have on the indication for treatment and on the prognosis. Notably, the difference between the putrescent germs and the different pathogenic germs, more particularly the virulent streptococci. Regarding the former, he maintains that hysterectomy undertaken in sapremic cases, like putrescent retained placenta, or gangrenous myoma, must be followed by recovery. That is, the prognosis is good by such procedure, but that the need for the operation is questionable. These germs grow only on dead tissue; to remove this dead tissue removes the disease. Exceptionally, Veit reluctantly admits, the placenta may have grown into the uterine wall, (placenta disseminata) or it is held in a deformed uterus (uterus duplex or bicornis) which may make its removal alone, without the uterus, impossible. In cases of gangrenous myomatous uterus where the tumor cannot be removed *per vaginam*, the removal of the useless uterus he regards is clearly indicated.

Regarding the pathogenic group of cases, if bacteremia prevails, more particularly if streptococci are numerously found in the blood, hysterectomy is unable to arrest the disease and hence is unavailing. Fromme, in his comprehensive article comes to the conclusion that every puerperal peritonitis shall be operated as early as diagnosticated. Where bacteria are found in great numbers in the blood, the prognosis is bad and the operation will avail little more than to give some subjective relief to the patient which will justify it. Without operation, all cases of puerperal peritonitis are fatal. He cites cases where the infection by hemolytic germs may travel through the wall of the uterus (metrolymphangitis), without the germs gaining access to the bloodvessels and hence without germs appearing in blood examinations. These cases afford a bad prognosis. All other cases of peritonitis operated early hold out a fair chance of success.

CASE I.—Mrs. R. O. American, age twenty-nine, robust health. Menstruated at fifteen; always regular. Married ten years; one child nine, twins six years old; no unusual incidents.

One miscarriage at two months one a year and a half ago, produced by professional abortionist. Chills and fever; full recovery. Dysmenorrhea in later years. Some leucorrhea since first birth; never chafing; no dysuria. Present illness began October 21, 1908. Patient, pregnant two and a half months, introduced a crochet needle into the uterus. This was repeated three days later when patient also took fifteen grains of quinine. Next morning uterine pains and profuse discharge of blood and clots. Foul odor from beginning; severe chills and fever. Physician curetted twice within two days, last November 1, under chloroform. Physician told friends, owing to unfavorable conditions at home of patient he had not succeeded as he should. He insisted upon immediate transfer of patient to hospital.

Patient was received in my service at the City Hospital, late in the evening of November 3, with the sensorium dulled by morphine. Patient complains of aching pains through hips, sharp pains and sense of fulness through abdomen, more marked below. Oral temperature 103.6, pulse 120 to 140. Abdomen distended, protuberant and tender. Foul, purulent discharge from vagina; retching and vomiting of muco-bile. This finding was reported to me about midnight. Directions were given by telephone—namely, low Watkins injection; sodium salicylate grains xxx, spirits camphor gtt. ij, normal salt solution oz. four by rectum, low, 105° F. Repeat hourly, five doses; then every four hours, with increase of normal salt solution to 16 ounces; hot vaginal soda douche, followed by lysol one-half of 1 per cent.; soda water copiously by mouth while retching continues; ice bag over lower abdomen; strychnia one-thirtieth grain hypodermically. I saw the patient early the next morning. Oral temperature 101.2, rectal 103.1; pulse variable as to volume and rhythm, 120 to 140. Sensorium clear, though excited. Patient said she felt better. Euphoria. Skin yellowish, slightly moist. Tongue moist, moderate white coating. Abdomen greatly distended; hard; tender to gentle touch, more below umbilicus; gentle pressure at various points elicited sharp pains; palpation and gentle percussion revealed highly distended, fixed bowels with varying resonance, at different points through lower abdomen. Vaginal touch revealed uterus low in normal anteflexion, distinctly outlined anteriorly, moderately enlarged, fair consistency. Posterior vault bulges toward vagina; parametria tender, somewhat boggy. Gentle attempt to move uterus called out pain. Moderate muco-purulent discharge, of foul odor. Watkins injection given the evening before, had brought fair amount of stool. Medicated enemata had been retained. Retching and vomiting continuous.

Diagnosis.—Septic endometritis and diffuse peritonitis. Exploration of uterus and abdominal section were decided upon. Chloroform anesthesia. Uterus was gently fixed with tenaculum forceps. Sound was easily introduced and confirmed the anteflexion previously diagnosticated. Internal length 3 1/4 inches.

Tentative use of small sharp curet brought very little scraping; no particles of placenta. Carbolic acid full strength was applied to endometrium on uterine dressing forceps carring small swab. This was to be followed by swab dipped in alcohol. There was a slight catch when internal os was reached. To overcome this, the forceps was twisted a little, when the instrument, without force glided upward and backward, a distance of about 3 inches. This was followed by a gush of foul, dark serous fluid containing black clots of blood, possibly an ounce. Finally a swab of alcohol was introduced into the uterus without difficulty. It was evident that the forceps had before passed through an old perforation of the uterus and tapped a collection of putrid old blood and serum in the culdesac of Douglas.

The abdomen was now opened over pubes. All the viscera below umbilicus were adhered together and were covered with exudate. Few adhesions were found higher up; here the intestines floated in purulent odorous serum. Separating the adhesions, pus in great quantities was encountered in various locations. Both tubes were found distended with pus. The fundus of the uterus, more at the right horn, was soft and malcolored, clearly indicating an abscess. At the site of the perforation in the culdesac was found malodorous, clotted blood and foul, heavy pus. The uterus at this part showed no infiltration or softening, *i.e.*, no evidence of pathogenic infection. A high supravaginal hysterectomy, including all the abscess region, and removal of both tubes was done. The tissues about the tubes and broad ligaments were found soft, friable, and bled freely. After all exudates were mopped up with moist gauze, extensive loose gauze packing was placed throughout pelvis and lower abdomen. The ends were led out at the lower angle of the wound. The rest of the wound was sewed in layers with catgut. One silkworm-gut was passed through all layers. The temperature fell at once. Barring the first night when it rose to 104.6, it rarely reached above 102° afterward. The pulse, during the first forty-eight hours was bad and required active hypodermic stimulation with strychnia and digitalis. Vomiting at once diminished after the operation, and ceased on the third day. At this time symptoms were ameliorated and recovery seemed likely. The rectal medication was continued every four hours for several days. Whenever the rectum became irritable, a low Watkins injection was given. This commonly discharged gas and feces and immediately afterward left rectum available for another medicated enema. The wound discharged copiously a foul sero-purulent matter for about ten days. The gauze packing was saturated with peroxide one to three times daily and removed in parts, some each day. It was eventually replaced by smaller wicks and tubes. Wound was closed and patient discharged December 29, fifty-five days after admission to the hospital. Patient recently has reported herself well as ever. Bowel function normal. Stump of uterus was found drawn some to left by contraction of left broad ligament; otherwise, pelvic conditions were found relatively normal.

Epicritically considered, we may assume that this patient became infected with the crochet needle. This developed an endometritis septica, from which resulted metrolymphangitis with localized abscess in right horn, and also extension of the inflammation to the tubes. Further, there was probable additional retention of placenta with sapremic infection. The efforts at curettage by the home attendant had resulted in perforation at the height of the internal os, followed by hemorrhage into the culdesac, and sapremic and pathogenic infection of this part of the peritoneum. By the repeated curettings was favored the extension of the infection to the fundal peritoneum and tubes. Thus the peritonitis probably arose from three sources, namely, metrolymphangitis extending directly to the peritoneum; tubular suppuration with discharge into the peritoneal cavity; and the perforation and infection through the upper cervix. Unfortunately no blood examinations were made. Probably it was a streptococcus infection though not of severest type. The robust health of the patient no doubt offered great resistance to the infection.

The partial hysterectomy, instead of panhysterectomy, was justified by the outcome. The writer thinks this procedure in such cases may be often found justifiable and preferable to complete hysterectomy. Less trauma, and less interference with innervation and circulation of the parts should have favorable influence in keeping up better natural local defensive function. The ultimate results after supravaginal hysterectomy are better, the writer is convinced, because the normal nervous and circulatory relations of this region, notably the bladder and rectum are retained more fully than after panhysterectomy. A few hours, at most days, would have resulted in gradual extension of the exudative peritonitis upward, grave sepsis, meteorism and death.

The presence of a clouded, nonodorous serum in considerable quantity in the upper abdomen was noted above. It certainly was striking. The bowels floating in this fluid were found not covered with exudate, and they showed no tendency to agglutination. The fluid was less purulent than that found below, and it had no foul odor. The writer has asked himself, may not such secretion be of another origin than that of the lower abdomen? An interesting observation of such a case by the writer dates back ten or twelve years. An infant of eight months was operated for diffuse appendiceal peritonitis. A gangrenous appendix bathed in foul pus was found thoroughly walled off from the rest of the abdomen. The rest of the abdominal cavity contained free, nonodorous, seropurulent fluid in great quantity, in which the intestines floated without exudate upon them, or adhesions. The child, contrary to expectation, made a most kindly recovery. Since then this condition was found repeatedly and pertaining to cases that ran a good course. A case of recent observation has special bearing on this point.

A male, cook, aged fifty-nine, had an attack two weeks ago diagnosed as appendicitis by the home physician. After ten days, patient was transferred to the City Hospital. The visiting surgeon there, I am told, found no evidence of appendicitis. The trouble was all referred to an incarcerated umbilical hernia of small size. The hernia was accidentally reduced under examination. Operation for the hernia was advised. The patient not wishing this operation, left the hospital. The sudden return of tenderness and pain in the right inguinal region after a few days, caused the former attendant to be recalled. The patient was sent to another hospital where the writer saw him. Oral temperature 99.6, rectal temperature 101.2. Tenderness and tumefaction in retrocecal location. The umbilical hernia was easily brought out when patient strained. The hernial opening admitted bulb of index finger. No peritoneal involvement, more than about cecum, was detected. Operation for appendiceal abscess was advised and accepted. Upon request of the patient, the closure of the hernia at the same sitting was agreed to, though not without some hesitation.

On opening the abdomen at the site of the umbilicus, there unexpectedly gushed from the abdominal cavity a clouded, nonodorous, serous flood. This exudation was regarded with anxiety on account[1] of the possible infection it might bring to the wound. Recalling my former observations when such conditions had prevailed, I decided to complete the umbilical operation. Next, an incision was made over the outer side of the cecum. A pocket of foul pus carrying within it the slough of the appendix was discharged. This pocket was perfectly walled off from the rest of the abdominal cavity. Cigaret drain. The subsequent course of the case showed a perfect healing of the umbilical wound though the other wound was slow to clean up and was not healed under three weeks.

From such observations, the writer feels warranted in concluding that a free peritoneal fluid surrounding an infected focal disease, which has no odor, and is unattended by exudate upon, and agglutination of intestines, indicates rather a reactive measure of nature to disease. Possibly this is not unlike the suppurative edema about an infected area in solid tissues. Its presence has a favorable bearing on the course of the case. It indicates good systemic defensive powers. It may be it has antitoxic qualities and as such, might be found available for therapeutic purposes.

The writer has never before found hysterectomy indicated in any of his cases of puerperal sepsis or peritonitis. This is stated to show his stand in this question. Either the cases seemed not to hold out any hope by such procedure, being seen too late, when they were moribund; or, as was often the case, the medical measures and lesser surgical procedures seemed all sufficient and more properly indicated. Amongst this number were four cases of large sloughing fibroids during the puerperium. All these were relieved by vaginal operation without sacrifice of the uterus, and ultimate full recovery.

224 North Meridian Street.

DISCUSSION.

Dr. Albert Goldspohn, of Chicago, said it had always been a subject of much regret with him that general practitioners did not seem to be educated by their teachers in regard to the pathology, the gross anatomical conditions, the difference between the ordinary gynecological curetment, and the cleaning out of the puerperal septic uterus. There were some general practitioners who did great damage in curetting the puerperal uterus with improper instruments.

Dr. Walter B. Dorsett, of St. Louis, agreed with Dr. Goldspohn that there was not enough stress laid upon the difference between the gynecological uterus and the puerperal uterus in the teaching of obstetrics, and gynecology in the medical schools. Out of twenty-five hundred physicians practising medicine in the City of St. Louis, he knew of but one man who confined his work exclusively to the practice of obstetrics. Obstetrical work was done by the general practitioners and by inexperienced men.

In the conduct of these cases he expressed the belief that the ordinary general practitioner was in too great a hurry to deliver the placenta. He had noticed this in his experience in hospital work, where physicians came in, who were well grounded theoretically, but he would watch them, conduct a case at term, and as soon as the cord was severed they would make efforts to deliver the placenta.

As to curetment of the uterus, the best curet to use was the placenta forceps recommended by Dr. Longyear.

Dr. J. Henry Carstens, of Detroit, said there were many general practitioners who did not grasp the modern principles of asepsis. The general practitioner who did everything, who attended cases of diphtheria, smallpox, and the like, who did not keep his finger-nails clean, should be taught to wear rubber gloves when he did obstetric work.

DR. ERNST JONAS, of St. Louis, stated that for years he had been talking about two or three kinds of infection after confinement. It was the opinion of most of the American obstetricians that there were only two kinds of septic infection, and those were the infection with peritonitis, and systemic infection, but we overlooked another infection which was not rare, and that was an infection which started from the cervix and invaded the parametrium.

DR. WALTER C. G. KIRCHNER, of St. Louis, pointed out that those who had charge of general hospitals frequently had to deal with this class of cases.

As to prophylaxis, in his experience the let-alone policy was the one that should be carried out. Those patients that came to him in general hospital work, where the child was perhaps born on a stretcher or in a street-car, were placed in bed without any particular attention being paid to them, and they got along best; but the cases that were examined and tampered with invariably got infected.

DR. H. W. LONGYEAR, of Detroit, said the essayist had pointed out clearly the difference between a pathogenic condition in the lower zone of the abdomen and the non-pathogenic condition of the exudate in the upper zone. The necessity for hysterectomy in these cases of infection was rare. He had only performed it once, and that was in a case where it was necessary.

DR. WILLIAM A. B. SELLMAN, of Baltimore, said that the placenta should be allowed time to be expelled, say twenty to twenty-five minutes. As a rule, by that time the uterine contractions came on again after the woman was a little rested, and nature in most cases succeeded in expelling the placental mass. In his cases he did not swab the uterus. He did not go inside the uterus, and he scarcely ever had a case of sepsis. He did not allow any vaginal syringe to be used for four or five days. Nature provided the best syringe and cleansing agent in the form of lochia. This protected the tissues from infection.

DR. ROBERT T. MORRIS, of New York, said the lochia was a protective fluid and better than anything that could be used in cases which had not been infected in some extraordinary way. As to operating on apparently moribund patients, there were many cases in which one could take out the uterus, snap a pair of forceps on either side of it, then use intravenously salt solution, and it was wonderful how this would change the features of the case.

DR. MILES F. PORTER, of Fort Wayne, did not believe in curetting the puerperal uterus. He thought if we looked upon a local infection of the uterus the same as we did a local infection surrounding the inflamed appendix, more women would get well. They would be lying-in a shorter time, and their recovery would be more prompt than it would be if we were to go on the principle that these infected uteri ought to be curetted and cleaned. If good drainage was provided, the majority of cases would get along nicely, and the curet as an instrument, as a rule, had better not be introduced into the uterus following labor.

Dr. William H. Humiston, of Cleveland, said that since he had adopted the let-alone policy in treating these cases, excepting in those in which there was hemorrhage, and then removing the plactena by placental forceps, his results had been much better in the hospital with which he was connected than before. These patients were treated conservatively. Their general condition was looked after, and then they were let alone.

Dr. Hannah M. Graham, Indianapolis, by invitation, related a case of puerperal infection in which she was called in consultation the third or fourth day after delivery. The patient at this time had a temperature ranging from 103° to 104°. She permitted the patient to sit up. She was not sure that the uterus had been cleaned out. In addition, a weak solution of bichloride was used as a douche. By allowing the patient to sit up it had the effect of emptying the uterus, so that on the second or third day thereafter the temperature declined to normal. She thought posture was of some advantage in these cases, and particularly it proved so in this case.

Dr. Pantzer, in closing the discussion, emphasized the fact that in the presence of cases that did not afford a clearly defined differential diagnosis, the let-alone policy was the one which was ordinarily commendable.

He said the treatment set forth in his paper was largely that collected from various authorities to show the diversity of opinion and the danger of certain methods of practice. The let-alone policy, emphasized by recent writers on the subject, was something that we could not and should not ignore.

Dr. Miles F. Porter, of Fort Wayne, read a paper entitled

CESAREAN SECTION, ABDOMINAL AND VAGINAL, COMPARED AND CONTRASTED.[1]

DISCUSSION.

Dr. E. Gustav Zinke, of Cincinnati, said the premises assumed by the essayist were wrong. Vaginal Cesarean section was never intended to be a competitor of abdominal Cesarean section; therefore, this argument fell to the ground for that reason. When Dührssen suggested this operation it was because of the frightful mortality as well as morbidity, maternal and fetal, resulting from the means employed in accouchement forcé. Vaginal Cesarean section was invented for rigid cervix; therefore, it was not an operation to be employed in cases of contracted pelves. He admitted that of the two operations the abdominal was the easier, and in the hands of a careful man probably the safer of the two. Vaginal Cesarean section had a definite place in obstetric surgery just as abdominal Cesarean section had, and the two should not be confounded.

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[1] To appear later in this Journal

Dr. J. Henry Carstens, of Detroit, said that these were not interchangeable operations. They were distinct operations and intended for distinct indications. Abdominal Cesarean section was for cases of narrow pelvis, where the child could not be born in the natural way. There was added vaginal Cesarean section for those cases where the pelvis was amply large, but where for some reason or other prompt delivery was to take place, and these were really the cases of eclampsia, where quick delivery was to be undertaken, and where one could slit the cervix and deliver the child in five minutes, sew up the cervix, and, as he had taught, every practitioner who practised obstetrics ought to be able to do that kind of operation. As to whether we should do vaginal Cesarean section or abdominal Cesarean section in the case of a roomy pelvis, it was a debatable question. Perhaps in one case it would be better to do abdominal Cesarean section, while in another case we could just as well do vaginal Cesarean section and arrest the hemorrhage.

Dr. Hugh O. Pantzer, of Indianapolis, endorsed what was said by the essayists and the previous speakers, with one exception. He thought there was ground upon which the two operations could be brought into competition. The author of the paper failed to mention the environment of the patient. If the patient was in a good environment, then the lines drawn by the speakers were correct.

He mentioned a case of a primipara, twenty-six years of age, who had two eclamptic seizures. In this instance the environment was most undesirable for abdominal section. Adequate assistance could not be had. He operated from below, but the delivery was not a quick one. Commonly in multiparæ one would have no difficulty, but in primiparæ he would have. For his part, he had never been able to console himself by making incisions about the vulva for the purpose of gaining space, and there gradual dilatation was a matter of some difficulty. He imitated nature and took time. It took an hour and fifteen minutes to deliver the child in this case, but he saved both mother and child. He saw the mother two months afterward, and found the uterus nicely united excepting at the vaginal portion, and this part would have to be freshened and resutured.

Dr. K. I. Sanes, of Pittsburg, thought the vaginal operation would be less dangerous for sepsis, and it was this that made him frequently select the vaginal route in preference to the abdominal in pelvic diseases. When one was brought in contact with a case in which the uterus had been handled a good deal outside, with possibly slight sepsis, and the woman having convulsions, he would have to decide on the abdominal or vaginal operation. Personally, he would prefer the vaginal operation, for the reason of making the incision extraperitoneally and allowing drainage to take place downward, instead of draining the infection up through and into the peritoneal cavity. The advantage of vaginal Cesarean section over the abdominal was lessened shock, and for this reason he preferred to do vaginal Cesarean section in cases of placenta previa where the patient had lost much blood. By opening the abdomen we added a great deal to the shock, which the vaginal operation would not do.

DR. PORTER, in closing the discussion, said that vaginal Cesarean section had been advocated for placenta previa, with viable child. It had been advocated and done in primiparæ, not with contracted pelves, but in primiparæ in whom it required from thirty minutes to one hour to effect delivery after it was done. Furthermore, this operation had been advocated for placenta previa by members of this association. The point in his paper was not to rule out vaginal Cesarean section and supplant it by abdominal Cesarean section, but to try and show the clear indications for both, and if the argument in the paper was correct, it resolved itself into this, that the abdominal operation was the operation of choice in primiparæ with ordinary pelves.

DR. JAMES F. BALDWIN, of Columbus, Ohio, read a paper entitled

DRAINAGE.[1]

DISCUSSION.

DR. ALBERT GOLDSPOHN, of Chicago, agreed with the essayist with reference to the efficiency of the capillary drain and the manner in which it was used, only he thought one could get longer efficiency of the use of the drain by having a short tube in the abdominal incision, when draining there, and also in the vaginal incision for the ventral route. He had had a short oval glass tube with a flange constructed, an inch and a half long, which projected through the abdominal parietes, and was wide enough to have the gauze protrude without compression. This enabled him to make an exact union of all layers in the abdominal wall, notably the fascia in front of the recti close up to the tube from below and down to it from above tightly, so that when the tube was removed the rest of the upper part of the wound would collapse. In this way one could get primary union even with this drainage provided it was not left in more than two or three days. In the vagina, if one made as large an opening as the essayist indicated, he thought branches of the uterine artery would be cut across going to the posterior vaginal insertion, causing undesirable bleeding. To ovoid this, he had seen Kelly make the opening with a scissors, then spread the opening and pull the gauze through, but the drain would soon be at an end, as the muscular structures in the vaginal vault were sufficiently powerful to constrict the gauze, so that inside of two days the drainage was rendered nugatory.

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[1] To appear later in this Journal.

Dr. William A. B. Sellman, of Baltimore, said that Kelly separated the tissues and introduced the gauze and drained the bottom of the wound. Two days later Kelly or his assistant exerted gentle traction on the gauze and pulled out from one-half to three-quarters of an inch of it. The explanation was this: at the point where it went through the vagina, or where the drain went through the abdominal wall, there was a collection of débris or mucus that came from the cavity and formed a kind of cork which prevented drainage, and the method the speaker had adopted was that practised by Kelly—namely, on the second day and every other day thereafter he withdrew from one-half to three-quarters of an inch of the gauze until finally the gauze was withdrawn altogether from the cavity.

Dr. J. Henry Carstens, of Detroit, said that for a great many years he had not used gauze for the purpose of drainage, as he could not see the philosophy of it, and it appeared to him to do more harm than good. He established drainage once in a while by puncturing the posterior culdesac, and inserting a rubber tube about the size of a lead pencil, with a cross piece, not for the purpose of getting raw surfaces together, but to drain the septic material and exudate thrown out by the peritoneum, which proved a fertile soil for the development of microorganisms, The rest he left to nature, and he thought his patients got along just as well as the patients of those who made use of more elaborate methods of drainage.

Dr. Baldwin, in closing the discussion, said some of the criticisms and suggestions were not well taken, because the object of the paper was to consider not the use of drainage for ordinary purposes, but its particular use to keep healthy tissues from contact with raw or diseased surfaces until the general peritoneal cavity was sealed off and danger of infection had passed. Gauze was not suitable at all for drainage when considerable amounts of fluid were expected to be discharged, but it was perfectly adapted for the purpose which was advised in his paper.

The paper was not designed to discuss in any way the amount of pelvic pathology which would make operation advisable, but it simply discussed a certain use of gauze after an operation had been made, and when the pathological conditions were such as to lead one to fear adhesions, or infection, or both. Such a use of the gauze had reduced his mortality and morbidity to the vanishing point, and gave him results which he had never secured before.

In his earlier experience he withdrew the gauze a little at a time, but later found that this was unnecessary, and was a great source of annoyance and pain to the patient. At the end of a week, however, its removal was accomplished with comparatively little pain, and the pain lasted but a moment.

In many of these cases, in arranging the parts on top of the gauze, they were placed in the position in which they were before the operation, and all the surfaces in contact with the gauze were already raw from separation of previous adhesions. It should be well understood that the gauze "fluffage" advised was not to take the place of tubular drainage, but was to be used for a very different purpose and to meet very different indications.

IS THE ROUTINE EXHIBITION OF THE PREOPERATIVE PURGE DEFENSIBLE?[1]

Dr. Edwin Walker, of Evansville, Indiana, read a paper on this subject.

DISCUSSION.

Dr. Albert Goldspohn, of Chicago, said the object of purging was to empty the small intestine. This was the thing that was in the way in doing surgical work and it was very essential, if possible, to exclude the general abdominal cavity while working and make the field of operation in the pelvis an isolated domain. When one wanted to operate on any particular segment, he did not want to expose the rest of the general peritoneal cavity, and this could be done best if the intestines were not distended. If they were collapsed, they would recede from the opening and could be easily held there by proper pads. He did not want to see the small intestine while doing an ordinary laparotomy any more than he wanted to see snakes, and the operator felt better if the intestine was not distended. If it was distended, it became subject to exposure to air and bruising, as experiments had shown. It was the business of the surgeon to keep all healthy peritoneal surfaces from contact with dry sterile air.

Dr. H. W. Longyear, of Detroit, said that the systematic use of purges in cases of ptosis of the colon only increased the congestion, increased the symptoms and caused spastic contraction of the bowel and his rule was to give lubricants and not cathartics. He used oil in such cases to facilitate the action of the bowel.

Dr. J. Henry Carstens, of Detroit, said that an inflammation which produced a diarrhea was entirely different from a diarrhea that was produced by the use of cathartics. Carthartics cause a hypersecretion from the mucous glands, so as to lubricate the parts and wash away the septic material. He thought a great deal of what the essayist had said was valuable and still one must use judgment in these cases. All things considered, the bowels should be pretty well emptied before an operation was undertaken.

Dr. Alexander Hugh Ferguson thought many patients were made less resistant to an operation by over-purgation. At the same time, sufficient purgation must be obtained to clear out the lower portion of the small bowel, and enemas given sufficient to clear out the large bowel. He recalled two cases of death from the gas bacillus. The gas bacillus was taken into the alimentary canal with green vegetables and both of these patients were operated on without the alimentary canal being cleaned out. They were cases in which he was called in consultation, and since then he had made it a rule to find out from the patients if they had eaten green vegetables. These two cases were so forcibly impressed upon his mind that now he always gave such patients two ounces of castor oil in addition to large enemas.

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[1] To appear later in this Journal.

Dr. Charles L. Wright, of Huntington, Indiana (by invitation) said that the portion of the paper which interested him more than anything else was with reference to giving cathartics before operation. It brought up the question of what caused constipation. The movement of the bowels was controlled by the sympathetic nervous system; that a disturbed patient might get constipation whether it was from an inflamed appendix, from gall-bladder trouble, or whatever disturbed the sympathetic nervous system. We disturbed Auerbach's and Meissner's plexuses which controlled peristalsis, these being distributed along the muscular coats of the intestines. When we performed an operation, immediately following it there was likely to be constipation. Why? Because these plexuses had been disturbed and the bowels might remain quiet for several days, maybe a week, from the shock done to these plexuses, and he thought that Metchnikoff was right when he said that if this material was allowed to remain in the bowels for a week, perhaps laden with germs, we might have toxemia from it, so that in order to prevent this we should stimulate these plexuses beforehand and anticipate constipation that was going to follow the cleaning out of the bowel, so that if constipation did follow we were always prepared for it.

Dr. Walker, in closing the discussion, said it was nonsense to purge patients when there was nothing the matter with them.

Dr. John W. Keefe, of Providence, R. I., exhibited a roll of rubber tissue, such as dentists used, saying that he had found it of great advantage in walling off the intestines from the pelvis, or in walling off the intestines from the gall-bladder in cases of gall-bladder surgery. He believed this rubber tissue was less irritating to the peritoneum than gauze sponges when used for this purpose.

Dr. Charles N. Smith, of Toledo, Ohio, read a paper entitled

TERMINAL EVENTS IN GALLSTONE DISEASE.[1]

DISCUSSION.

Dr. Miles F. Porter, of Fort Wayne, emphasized the importance of operating on gallstone cases before the more serious terminal results occurred. He was interested in what the author of the paper had to say regarding posterior gastroenterostomy, in which the pylorus was obstructed because of adhesions about it or the gut below, or because, on the other hand, of adhesions that were hard to break up and which hung the pyloric orifice up under the liver. This had occurred a number of times in his experience, and in some cases the separation of the adhesions was not only difficult but accompanied by considerable trauma of the liver. In many cases, after the adhesions were liberated, one might have a greater difficulty to overcome—namely, the reformation of adhesions in the position they were before, and he was therefore impressed that in many of these cases they could be better treated by a posterior gastroenterostomy in so far as the relief of this feature was concerned.

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[1] To appear later in this Journal.

Regarding the removal of the gall-bladder, he very rarely did a cholecystectomy, yet within the last sixty days he had done four out of two-thirds of the gall-bladder work he had done in that time. These happened to be cases that required cholecystectomy. The gall-bladder, however, should be preserved, if possible, as long as it was functionating and communicated with the liver.

Dr. Thomas B. Noble, of Indianapolis, said there was nothing in the whole field of abdominal work that offered such attractions as the sequential pathological processes incident to cholelithiasis. He referred to pericholecystitis in which changes occurred in the stomach due to the encroachment by the inflammatory exudate upon the pyloric area. In such conditions we would have gastric neuroses as well as true anatomical disturbances following. While the author of the paper had advised gastroenterostomy in such conditions, personally the speaker would much prefer doing the Finney operation. Of all operations in this region there was nothing more satisfactory than a Finney operation. He did not favor establishing an artificial opening between the intestine and stomach unless every other procedure failed. But a Finney operation maintained the normal route, made drainage free and perfect, and in the five cases in which he had practised it he had very satisfactory results, and so he favored this operation rather than gastroenterostomy.

Dr. Smith, in closing the discussion, said the Finney operation, in the presence of extensive, firm, dense adhesions, was an extremely difficult operation to do, and it was because he did not wish to disturb the adhesions that he did gastroenterostomy. He could have separated the adhesions and probably liberated the duodenum and overcome the angulation of it, but he did not consider this advisable because the adhesions were so liable to reform after the operation, and for that reason he did gastroenterostomy, and he still felt in those cases,—rare of course,—gastroenterostomy was the indicated operation.

Dr. Thomas B. Noble, of Indianapolis, read a paper entitled

REMOVAL OF THE UPPER PORTION OF THE RECTUM AND SIGMOID; REPORT OF A CASE.[1]

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[1] To appear later in this Journal.

DISCUSSION.

Dr. Chas. N. Smith, of Toledo, said the device exhibited by Dr. Noble appealed to him very much, because a few years ago in a case in which he made an anastomosis with the rectum low down, it was so deep that he had to tuck a Murphy button at the end of a long forceps to get down with a long needle-holder to sew, and had such great difficulty in placing the Murphy button that he could see how if he had had this device he could have placed it there very easily. In certain conditions,—of course, they were not many,—he could see where this instrument would fill a want.

Dr. John Young Brown, of St. Louis, said that those who had had experience in the surgery of the lower bowel fully appreciated the difficulty of making an anastomosis in that locality. It was simply astonishing the ease with which the large bowel could be manipulated in doing a button or a suture operation, but the difficulties could only be appreciated by those who had done work of the type for which this instrument was devised. This instrument was a valuable contribution to this particular class of surgical cases. It was unique in its originality, and while many surgeons may have thought of it, they have never worked it out. The other point that appealed to him personally was the manner in which the essayist handled the uterus in his case.

Dr. Walter C. G. Kirchner, of St. Louis, said that the device used by Dr. Noble in the case reported to enable him to preserve the sphincter, and in that way to allow the patient to live in a comfortable way, was very commendable. In a number of cases of cancer of the sigmoid he had been able to use the large button, but it happened occasionally, when the fixed portion of the rectum was involved, this was not possible.

Dr. John W. Keefe, Providence, said the author had stated that the lower portion of the bowel was not covered by peritoneum. It seemed to the speaker that the action would be quite different from what we got in ordinary anastomosis with the Murphy button. We depended upon peritoneum there, while in the lower portion we had no peritoneum. It seemed strange that he would have peritoneum, with no leakage, unless a number of sutures were put around after closing the instrument.

Dr. Noble, in closing the discussion, said he would not call it a new device, but simply a new application of an old principle. The time had come when surgeons had to do some other work than they had been doing with reference to carcinoma of the cervix. There was a time when surgeons amputated the cervix, then took out the uterus, and were just about starting in carcinoma of the cervix. He felt that we must follow the philosophy and teaching of Wertheim, even go further than that and take out portions of the rectum. Without the use of such an instrument as he had shown, in cases of infiltrating malignant growths extending from the cervix into the rectum, the procedure would be a difficult and protracted one, and attended with a high death rate.

Dr. O. G. Pfaff, of Indianapolis, read a paper entitled

MALIGNANT TUMOR OF UNDESCENDED TESTICLE.[1]

DISCUSSION.

Dr. John W. Keefe, of Providence, said that, according to the literature of the subject, these patients were prone to have malignant disease, as the essayist reported in his case, yet the speaker recalled the case of a physician who had undescended testicle on each side, and lived to be seventy-eight years of age, with very little discomfort from it. In another instance he recalled there was torsion of the undescended testicle producing strangulation, necessitating its removal. In many instances, in early life, it was possible to bring the testicle down and fix it in the scrotum. This was an ideal operation and should be done early. It did not follow that because a man had undescended testicle he was going to have malignant disease.

Dr. Walter C. G. Kirchner, of St. Louis, said that on one occasion in his experience it was necessary to remove a testicle that had been strangulated after an injury. This emphasized the importance of proper treatment in the early stages for the relief of undescended testicle.

OFFICERS.

The following officers were elected for the ensuing year: *President*, Dr. A. B. Miller, Syracuse, N. Y.; *First Vice-President*, Dr. Charles N. Smith, Toledo, Ohio; *Second Vice-President*, Dr. Raleigh R. Huggins, Pittsburg, Pa.; *Secretary*, Dr. William Warren Potter, Buffalo, N. Y.; *Treasurer*, Dr. X. O. Werder, Pittsburg, Pa.

Syracuse, N. Y., was selected as the place for holding the next meeting; time, September 20, 21, and 22, 1910.

REVIEWS.

Physical Diagnosis. By Richard C. Cabot, M. D., Assistant Professor of Medicine in Harvard University. Fourth edition; revised and enlarged. With five plates and two hundred and forty figures in the text. pp. 579. New York, Wm. Wood and Co., 1909, $3.00.

Dr. Cabot's work on physical diagnosis is so well and favorably known that little more is needed than the announcement of a fourth edition. A number of small changes have been made, the most important of which concern the use of the free ear in auscultation, the discussion of bronchiectasis and the differences between the two sides of the normal chest. The qualities which have made the book successful are brevity, simplicity, directness of statement, and the fact that the author gives that which long experience has proved of value to himself.

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[1] To appear later in this Journal. Papers were presented also by Drs. Tate, Stewart, Cannaday, and Sanes which will appear in this Journal.

AMERICAN PRACTICE OF SURGERY. A Complete System of the Science and Art of Surgery by Representative Surgeons of the United States and Canada. Edited by JOSEPH D. BRYANT, M. D., LL. D., and ALBERT H. BUCK, M. D. Complete in eight volumes. Profusely Illustrated. Volume V. pp. 916. New York, Wm. Wood and Co., 1909.

This volume continues the discussion of regional surgery. The opening article, by Charles R. Torrer, D. D. S., of Philadelphia, is on prosthesis in its relation to surgery of the face, mouth, jaws, and nasal and laryngeal cavities. The second chapter, on the surgery of the nasal cavities and accessory sinuses, is by Harris Peyton Mosher, of Boston, and is to be especially commended for its admirable exposition of the description and applied anatomy of the nasal region. Surgical diseases and wounds of the mouth, tongue and salivary glands, are well described by George E. Armstrong, of Montreal, and diseases and wounds of the neck, by John M. Elder, of Montreal. An interesting chapter on the surgery of the thyroid and thymus is by Francis Shepard, of Montreal. Norman B. Casson, of St. Louis, discusses the surgery of the thorax and spinal column, and Harvey Mudd, of St. Louis, the surgery of the breast. The chapter on surgical diseases and wounds of the external genitals and vagina of the female is by William P. Graves, of Boston. No mention is made of the modern and very efficient methods of treating cystocele by extensive separation of the bladder from the vaginal wall or of treating prolapse of the uterus by turning the fundus forward under the bladder and against the anterior vaginal wall as in the operations of Stone or Goffe and Watkins. The section on surgical diseases and wounds of the male genital organs, is written by Franklin G. Balch, of Boston, and those on chancroid and gonorrheal urethritis, by Hugh Cabot of Boston. The final chapter on surgical diseases and wounds of the jaws, is by J. C. Bloodgood, of Baltimore.

TRANSACTIONS OF THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION. Vol. xxi. Edited by W. D. HAGGARD, M. D., pages 488. Published by the Association, 1909.

This volume contains the proceedings of the twenty-first session of the society, held at St. Louis, Missouri, on December 15, 16 and 17, 1908, and memorial notices of Richard Douglass and Morgan Cortledge. The papers cover a wide and interesting field. The address by the president, F. W. Porham, on Conservative Surgery, might be read with benefit by every surgeon. Some other notable papers are on Suprapubic Prostatectomy, by

Arthur Dean Bevan; Surgery of Kidney Stone, by Maurice Richardson; Resection of the Bowel, by Shelton Horsley; The Mortality in Operation for Goitre, by C. H. Mayo; Temporary Ventrosuspension of the Uterus, by Edward Ochsner, and Prostatectomy, by Deaver.

DIET IN HEALTH AND DISEASE. By JULIUS FRIEDENWALD, M. D., Professor of Diseases of the Stomach in the College of Physicians and Surgeons, Baltimore; and JOHN RUHRAH, M. D., Professor of Diseases of Children in the College of Physicians and Surgeons, Baltimore. Third revised edition. Octavo of 764 pages. Philadelphia and London, W. B. Saunders Company, 1909. Cloth, $4.00.

The need of a new edition within three years bears ample testimony that this book has met with favor.

This edition differs from the preceding in the following particulars: The articles on milk and alcohol have been rewritten. Additions have been made to a number of chapters, of which the most important are those on tuberculosis, the salt-free diet, rectal feeding and the caloric needs of infants. Several useful tables showing the caloric value of foods have been added, as well as Winton's valuable table showing the composition of diabetic foods. A short account of the simple methods used to detect certain food adulterations and preservatives has also been inserted.

These changes have necessitated the addition of about thirty-two pages of text and are both opportune and adequately carried out. The book remains, in our opinion, one of the most satisfactory on the subject of which we are cognizant. E. M.

ITEM.

THE STATUS OF OBSTETRICAL TEACHING.

The president of the AMERICAN GYNECOLOGICAL SOCIETY has appointed a committee to report at the next annual meeting in Washington on the present status of obstetrical teaching in Europe and America and to recommend improvements in the scope and character of the teaching of obstetrics in America.

The committee consists of the professors of obstetrics in Columbia University, University of Pennsylvania, Harvard, Jefferson Medical College, Johns Hopkins University, Cornell University, and the University of Chicago.

Communications from anyone interested in the subject will be gladly received by the chairman of the committee, DR. B. C. HIRST, 1821 Spruce Street, Philadelphia, Pa.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

REMARKS BASED ON RECENT STUDIES OF DIARRHEAL DISEASES.*

BY
WALTER LESTER CARR, M. D.,
New York.

TEXT-books on diseases of children written thirty or thirty-five years ago gave three principal causes for the diarrheas of early childhood, namely, bad food, heat and humidity. Dyspepsia, nervousness, a depressed state of the system and many other causes were also mentioned. Thunder storms were popularly held responsible for changes in milk sufficient to produce diarrhea.

With the work of Escherich (1886) and Baginsky (1888) in Germany and of Booker (1887–89) in this country the bacteriology of diarrheas was studied so far as to show that many cases formerly regarded as eliminative, fermentative and nervous, were in reality of infectious origin and that their symptomatology while descriptively picturesque was unscientific. Booker carried his observations on the bacteriology of summer diarrhea to a period that seems recent but his work did not differentiate the bacteria that cause the severe epidemics of the hot weather. It remained for Shiga, a Japanese investigator to study epidemic dysentery in Tokio during 1897 and 1898 and to discover the bacillus known by his name. Flexner found an organism closely related to the Shiga in epidemics observed in the Philippines and in 1902 Duval and Bassett detected dysentery bacilli in the stools of forty-two out of fifty-three infants suffering from diarrheal diseases occurring in Baltimore. The particular clinical value of Duval and Bassett's work lies in the fact that these children did not disclose symptoms different from those usual to the diarrhea common in summer.

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*Read before the William Pierson Medical Library Association, Orange, N. J., February 9, 1909.

The three types of the dysentery bacillus group now described are first, the Shiga, second, the Flexner, and third, the Hiss or "Y" type.

In observations made on seventy-four cases of infantile diarrhea in Baltimore dysentery bacilli were found in forty-two. Three of these gave only the Shiga bacillus; in fourteen cases the variety called the Hiss "Y" type, closely related to Flexner's bacillus, was found alone; and in six of the forty-two cases the Flexner bacillus was isolated. In thirteen of the series the bacilli were mixed,—not of the same variety. These general observations have been confirmed by other experiences and the information leads us to believe that an epidemic of summer diarrhea may show all types of the dysentery bacillus, including the original Shiga bacillus. Park has regarded the infection from the original Shiga culture as of greater severity than from the allied bacilli and he has suggested calling the other types "paradysentery bacilli," but this term is not yet generally accepted.

Although the majority of cases of epidemic summer diarrhea in children are caused either by the Shiga bacillus or a type closely related to it, we are unable to state that all of the severe cases are caused by the Shiga type alone and the reports show that intense dysenteries occur that are termed mixed infections, one of the dysentery group plus streptococci, etc.

Not all cases of summer diarrhea are dysenteric in the sense that this word was formerly used and accepted by many practitioners, namely bloody, mucous stools with tenesmus due to ulceration and hemorrhage from the lower bowel. It is perhaps unfortunate that Shiga's name has been associated with all forms of summer diarrhea and not limited to the dysenteries common in Japan and hot countries.

Flexner's bacillus is the one most commonly observed in summer diarrhea in America, either with or without the presence of bloody stools.

The exact relationship the Flexner bacillus bears to summer diarrheas of all kinds cannot be determined until a series of epidemics or cases is worked out by bacteriologists who are equipped with enough clinical data to classify each type of bacillus in a series showing the histories of the cases side by side with the bacteriological findings. Just as we know that the tubercle bacillus and the bacillus of diphtheria vary in virulence so we presume the bacilli of Shiga and Flexner vary in intensity of action in different subjects. Sporadic colitis due to Shiga's (true) bacillus is rare but in follicular enteritis (clinical type) the Flexner bacillus is almost always found. Recent views are expressed as follows:—

Knoepfelmacher (*Medizinische Klink*, 1908, iv, 1293) believes that the Flexner type of the dysentery bacillus is responsible for almost all cases clinically diagnosed as follicular enteritis. Dopter (*Archiv. de Med. Exper. et d'Anat. Path.*, 1907, pp. 282, 505, 587) gives the following as the order of changes in the mucous membrane of the intestine occasioned by the dysentery bacillus.

1. Catarrhal inflammation.
2. Preulcerative.
3. Ulcerative.

1. At first there is a general reddening of the mucosa; catarrh and a few bacilli can be detected.

2. There is necrosis of the mucosa, very extensive and progressive. The submucous coat is thickened, edematous and phlegmonous in appearance. Many bacilli are demonstrable.

3. There is broad, superficial ulceration at first only of the mucosa, but later the ulceration deepens in acute but somewhat prolonged cases, bearing out the view that mixed infection cause the ulceration.

As we study bacillary (infectious) diarrheas we are led to enquire where are the fermentative diarrheas and the cholera infantums of a previous decade. When our classification was partly anatomical and partly etiological, that is etiological so far as the general knowledge of causative influences was understood before pathogenic bacteria had been studied, the influence of cold, heat, bad food or change of clothing was made important as a direct cause in diarrheal disease. At the present day we recognize such influences but we know that heat or cold alone is rarely a cause of summer diarrhea, as it is the lowered resistance of the system that allows of the activity of specific organisms which are already in the intestinal canal. Just as colon bacilli may be present in the intestine and diphtheria and pneumonia organisms in the air passages without infecting the system until the mucous surfaces are irritated or resistance of the cells lessened, so possibly may one or another form of dysentery bacillus find its way into the cells and with its toxins into the circulation. The dysentery bacillus may remain in the intestine of a child who has the infection or who has had an apparently cured mild "dyspeptic diarrhea." Kruse (*Klin. Jahrbuch*, 1908, 19, p. 529) regards every case of dysentery as a possible source of infection for from one to two weeks after cessation of symptoms. In relapses the bacilli are numerous but in chronic cases they are not easily found. Cases of so-called sporadic dysentery, asylum dysentery and follicular enteritis are especially liable to spread the disease. These observations aid us because they make evident that a clinical classification is doubtful in many cases.

A strictly self limited anatomical area for intestinal diseases does not exist. It does not matter how definitely the clinical symptoms point to a localized inflammation of the ileum the macroscopic appearance of the membrane may not disclose enough change to account for the symptoms. Late investigations in bacteriology lean to a nomenclature that describes a certain section of intestine as being the seat of the disease only as elucidating in a clinical manner what is due to bacterial action. This is more definitely fixed in our minds by regarding, for the moment, typhoid fever. No one calls this a primary ulceration of Peyer's patches for the ulceration is not the only, even if a characteristic process, as the disease is in reality an invasion of the system by the typhoid bacillus, and this pathogenic organism and its toxin may produce changes in remote organs, such as the brain. The ulceration and necrosis of tissue in the intestines show not only typhoid bacilli, but secondary microorganisms that are destructive in their action. In the same manner the invasion of the intestine by the Shiga bacillus or one of its group will, as Dopter states, produce at first simply a catarrhal inflammation. Later in the disease there will be ulceration which is clinically diagnosed as follicular enteritis or ileocolitis and may be caused largely by a mixed infection. The toxins produce effects on the nervous and circulatory systems, as fever, restlessness, etc. In the acute gastrointestinal infections the toxicity from the first invasion may be so great that the nervous system is damaged by the overwhelming poison, frequently before the local action of the bacilli is sufficient to cause gross changes that can be found on autopsy.

A few of the diarrheas of children may possibly be simple or eliminative in character but the majority are occasioned by the presence of microorganisms. The symptoms may point to an anatomical limit for each disease but we must acknowledge candidly that a gastritis may really be a gastroenteritis, even an enterocolitis, a colitis may be an enterocolitis or a gastroenteritis, and a proctitis may be the associate of a colitis. Postmortem examinations show the fallacy of too strict clinical and anatomical designations, for the bacterial invasion may produce few localized symptoms and the system at large may bear the brunt of the disease.

Dopter (*q. v.*) has recently called attention to the fact that in bacillary dysentery there may be lesions of other organs as follows:

1. Inflammation of the peritoneum and great omentum.
2. Inflammation of the mesenteric lymph nodes with necrosis.
3. Cholangitis.
4. Abscess of the liver.
5. Softened areas in brain and cord due to toxins.

In this connection it may be well to mention the acute degeneration or "cloudy swelling" of the kidneys that Morse, Holt, Jennings and others have found in this class of cases, confirming the opinion of Delafield and Prudden. Unfortunately this phase of infection in gastroenteric diseases is overlooked and is a cause of mortality because physicians rarely examine the urine of infants and children ill with summer diarrhea.

Serum Treatment.—Shortly after Shiga's discovery the treatment of dysentery by an antitoxin was undertaken. In Japan serum from horses that had been gradually immunized was used with a reduction of the death rate from 30 per cent. to 10 per cent., a decided lessening of severe symptoms and a shortening of the course of the disease.

Although the results in other countries have not been so satisfactory they may be explained in part by the fact that the antitoxin first used against the true Shiga infection does not always answer for the Flexner or Hiss type of bacillus. The bacilli of the original Shiga strain produce in cultures or in suspension a definite soluble toxin and against this an antitoxin has been obtained. Knoepfelmacher states that the Flexner group of bacilli does not form a soluble toxin and is not influenced by the serum. The difference in the results is thus explained.

Recently two French observers (Coyne et Anché) have made a serum which they regard (*Rev. Méd.*., Dec. 10, 1907) as curative for the Flexner, as well as for the Shiga types of infection.

The dosage of these sera varies according to the severity of the disease. In mild cases it is given in 20–30 c.c. and in severe and toxic cases the dose is 50–100 c.c.

Hiss and Zinsser of the department of bacteriology of the College of Physicians and Surgeons, New York, have in a recent communication, "Experimental and Clinical Studies in the Curative Action of Leucocyte Extracts in Infections," shown that great improvement of the toxic symptoms of meningitis and pneumonia followed injections of leucocyte extracts. Reasoning from their animal experimentation they express the opinion that the major action of the leucocyte extract seemed to be principally one of poison neutralization. This is a promising field for future investigation for if the leucocyte extract can be employed as an adjunct to the antitoxin of dysentery, we will have two valuable agents to use against severe dysenteries and acute gastroenteric toxemias.

From these brief remarks on the intestinal diseases observed during hot weather and in epidemics during some seasons we learn that recent studies in bacteriology have advanced our knowledge of the diarrheal diseases:

1. By showing that the majority of them are of bacillary origin.
2. That their origin may be endemic as well as epidemic.
3. That not all cases of infectious diarrheas have bloody stools.
4. That the dysentery bacillus is almost always detected when there are blood and mucus in the stools and,
5. That the clinical symptoms most often point to an ileocolitis but they may be very acute without grave pathologic changes.

Prophylaxis.—Kruse (*q. v.*) states that every case of dysentery is a possible source of infection for one to two weeks after cessation of symptoms. In relapses the bacilli are numerous and he calls attention to the sporadic cases and to the cases seen in institutions. As these statements agree with the work of Duval, Bassett and Knox I quote Knox's words (Transactions American Pediatric Soc., Vol. xix, 1907, p. 203. "A careful consideration of the clinical histories of these patients (Duval and Bassett's cases) failed to disclose that the particular infants studied exhibited any symptoms uncommon in the usual diarrheal diseases of the summer."

In the collective investigations made by the Rockefeller Institute and reported by Flexner and Holt (Studies from the

Rockefeller Institute, 1904, p. 193) the dysenteric bacillus was found in 63.2 per cent. of the 412 cases. While present in the inflammatory diarrheas the bacillus was found in affections of all degrees of severity. Apparently the dysentery bacilli have no natural habitat outside of the human body but they are found after intimate exposure—from direct inoculation. They may live from four to nine days on cloth, paper and wood at a temperature of 17–20° C. They may live in bread for a month and in sterile milk until this medium is dry. In sterile water they rarely live longer than a week. Vincent found that the bacilli live longer in the dark than in the sun light and direct sunshine kills them quickly. The most important of all these facts bearing on the prophylaxis and treatment of bacillary diarrheas is that these organisms are kept alive in the intestines of ill or convalescent patients who have been exposed to the disease.

From these observations, which have been confirmed by others equally competent, we are justified in taking the following precautionary measures in cases of summer diarrhea.

1. Children with summer diarrhea should be isolated and kept in a tent, on an open piazza or in well ventilated room.

2. Stools and urine should be thoroughly disinfected by bichloride of mercury or carbolic acid.

3. Diapers and articles of clothing and bedding should be soaked in bichloride or carbolic solution before washing. All clothing should be dried in the open air, *never* in the room.

4. Nurses and attendants should wash patients with an antiseptic solution and should disinfect all vessels, utensils, thermometers and other articles.

5. No beds or mattresses used by a patient with summer diarrhea should be used by another patient without being washed and disinfected by heat or thorough antiseptic methods.

6. In hospitals and institutions nurses and attendants caring for children with bacillary diarrhea should not be allowed to prepare food for other children nor to handle food material for children not under their care.

To these precautions may be added: some measure of safety can be secured by having diapers of cheese cloth and cotton, to be burned instead of washed. Milk and other food should be kept covered and never exposed in the room. Ice chests should be kept clean and should be sunned and aired. Water for drinking should be sterilized and kept in stoppered bottles.

68 WEST FIFTY-FIRST STREET.

CORRESPONDENCE.

SYMELUS.

To the Editor of the American Journal of Obstetrics and Diseases of Women and Children.

Dear Doctor:

Thinking that it may be of interest to your readers I send you a photograph of a one legged baby that I delivered sometime ago at full time. It was a breech presentation. The body of the child was well developed. The leg contained two thigh bones, two knees and four leg bones. There was no anus or sexual parts. It lived a few hours after delivery.

Yours very truly,
Will S. Howell.

Moultrie, Georgia.

The monster is a very remarkable specimen of symelus and in the olden days would have aroused a strong suspicion that its unfortunate mother had been too familiar with a merman. Hirst and Piersol (Human Monstrosities, page 87) say in speaking of this type: the symeli are characterized by an imperfect development of the pelvis and lower extremities; by *atresia ani et urethræ,* by more or less intimate fusion of the lower extremities, and by a twisting of the lower limbs so that the femora are united by the internal condyles, the legs by the fibulæ, and the feet, if they exist, by the fibular edge and little toes, so that the heels look forward.

The study of the factors underlying the production of monsters is of great interest. The increasing knowledge of comparative embryonal morphology together with recent experimental researches point to two causes of these aberrant forms--defects in the germ cells supplied by either or both parents, or abnormal conditions influencing the development of normal ova. Those who are interested in the subject can refer to the paper of Dr. Stockard in the April, 1909, number of the Americal Journal of Obstetrics and through it to the papers of Mall and Wilder.

PLATE II

AMERICAN JOURNAL OF OBSTETRICS
AND
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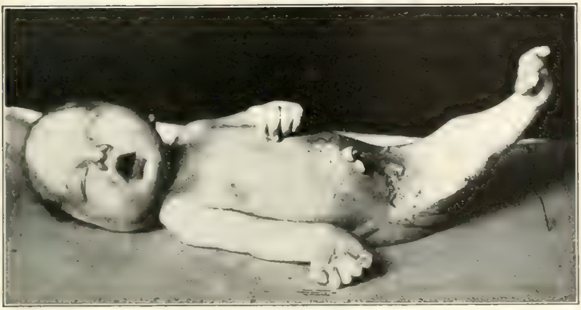

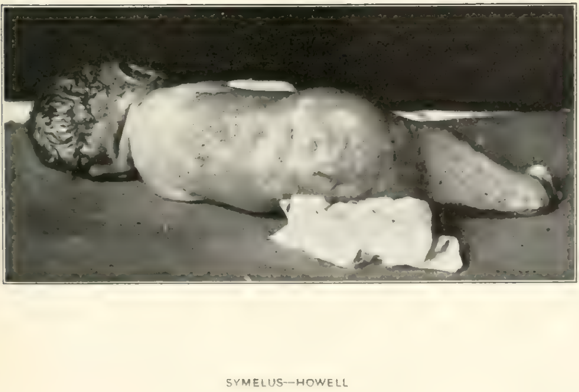

SYMELUS—HOWELL

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Aural Complications of the Exanthemata.—C. R. C. Borden (*Bost. Med. Surg. Jour.*, July 15, 1909) finds that in scarlet fever, children are quite liable to middle-ear inflammation, which may or may not involve the mastoid cells. Adults are much less so, and rarely have mastoiditis. In measles, both adults and children are very susceptible to middle-ear involvement, and adults are especially in danger of mastoiditis. In cases where much aural discharge is present for more than two or three weeks, the mastoid operation should be seriously considered as a means of providing drainage, other than through a small pin-hole perforation in the membrana tympani. Occasionally a case will arise in which the diagnosis may be difficult. If, after carefully ruling out every other possible cause by exclusion and the mastoid remains in doubt; if the symptoms of the patient are at all serious, *operate*. The danger is greatest from waiting. If, after the acute symptoms of scarlet fever and measles have subsided, pus in the middle ear is kept active by profuse nasal or nasopharyngeal discharges, examine the patient for adenoids. If the growths are present, remove them thoroughly. This procedure in the course of diphtheria, however, is questionable.

The Exudative Diathesis.—Claudio Ventura (*Riv. di Clin. Ped.*, June, 1909) says that in infancy, and especially in the nursling, several phenomena natural to that time of life and others that are of a pathological nature group themselves into a sort of exudative diathesis, determining oscillations of turgescence in the various internal and external organs. These occur especially at the time when the bones have not sufficient strength to sustain the body. The exudative diathesis is an individual condition, in part hereditary, under favorable conditions remaining latent, but brought into action by errors in diet in the nature of an excess of fats. The lesions affect the skin, mucous membranes and internal organs, there being transient periods of turgescence. Only by frequent repetition do these cause changes that are permanent. The characteristic of these manifestations is their evanescence. They appear at a very early age and lessen after the second year of life. As to hereditary influences we recognize advanced age of the progenitors, debilitating diseases, etc. The diathesis generally occurs among the working classes, less often in persons of leisure. The geographical tongue, lasting but a few days at a time, is noted as one of the manifestations of this state, accompanied by no disturbance of health, and appearing in several members of the same family. The tonsils and pharynx are subject to the transitory periods of congestion and irritation, the nose being stopped up and dyspnea being caused by the swelling. Collections of secretion in the tonsillar crypts may occasion foul breath and anorexia. Finally a permanent hypertrophy of the tonsils arises from frequent repetition of the attacks. The extirpation of such tonsils is not advisable. Acute bronchial attacks, characterized by asthma, with little secretion, and no physical signs come under this head. The conjunctival and vesical mucosa, and even the intestinal mucous membrane may be affected. Various cutaneous eruptions occur. Yellowish crusts, the removal of which leaves a wet, secreting surface, may form on the infant's scalp. Strophulus, urticaria, and pustules are all caused in this way. These manifestations occur suddenly and disappear as quickly. Enlargement of the liver is another frequent manifestation. Examination of the blood and urine in cases of this kind gave no unusual phenomena. The treatment of this condition consists in giving only enough food to sustain life, the foods that cause formation of fats being cut out of the diet. If the infant is nursing, the mother must employ such a diet as will reduce the amount of cream in her milk. The child should have change of air at the same time Medicinal treatment is directed only toward palliating the local symptoms.

Reappearance of Laryngeal Stenosis at the Moment of a Serum Eruption in Children Affected by Diphtheria.—Rocaz and Firmin Carles (*Gaz. Hebd. des Sci. Med.*, June 27, 1909) direct attention to the fact that in children with laryngeal diphtheria, after relief has been obtained from the stenosis by the use of antitoxin, if a serum eruption occurs, there may be a coincident edema of the laryngeal tissues, causing stenosis, and this may lead one to believe that the membrane has reformed in the larynx. This will occur from three to five days after the injection of serum. If the child has been intubated it is best not to extubate too quickly, lest we should have to replace the tube. If congestion occurs at this time it is not advisable to interfere too quickly, since this condition lasts but a short time. The author gives histories of five cases in point.

Types of Pulmonary Tuberculosis in Young Children.—James M. Miller (*Brit. Jour. Child. Dis.*, June, 1909) says that cases of pulmonary tuberculosis may be classified: (1) according to the path of infection; (2) according to the distribution of the disease, whether generalized or localized, whether disseminated throughout the whole lung or restricted to certain areas and spreading from these; (3) upon the basis of histological appearances. There are objections to all these methods of classification; none are entirely satisfactory. The only method left is to adopt a compromise between them. The author suggests the following as the simplest method of classification, and one which includes all types of the disease. 1. Disseminated metastatic tuberculosis (miliary tuberculosis). 2. Caseous bronchopneumonia, or merely caseous pneumonia. 3. Fibro-caseous pneumonia. Both of the last two conditions may be complicated by the presence of cavities. The first category includes all cases where there are discrete tuberculous areas scattered through the lung. The word metastatic is necessary to indicate that there has been a primary focus from which the nodules have taken origin. The next great group of pulmonary tuberculous conditions is the caseous pneumonias, or, as they usually are, at any rate in this early stage, caseous bronchopneumonias. The line which divides this group from the preceding is by no means well-marked. The method of spread in these cases is more by continuity of tissue. The writer has never seen tuberculous disease limited to the lung in the infant such as one often observes in the adult. The general rule is to find foci in distant parts, the result of a blood infection. The third group of tuberculous conditions of the lung in children are those where formative and destructive processes have proceeded side by side, where there has been interstitial inflammation with fibrosis, and parenchymatous inflammation with consolidation and subsequent caseation. This is the commonest condition found in phthisis of the adult, but it is rare in the infant. In these cases of advanced tuberculosis it is only by studying sections stained by the elastic tissue method that one can properly understand and follow the disease. Areas which, when stained by ordinary methods, would appear almost structureless, are found to contain obliterated vessels and bronchi. The cavities in these cases are lined not by caseous lung, but by a layer of granulation tissue, which protects the lung proper and limits the process.

The Door of Entry of Tuberculosis in Infants.—V. Hutinel (*Arch. de Méd. des Enf.*, July, 1909) discusses the various method of entrance of the tubercle bacillus in the nursling, each of which has been considered by different authorities as the most frequent point of entry. The author, after weighing the evidence for the intestine and the tonsils, concludes that the most frequent method of entrance of the bacillus is by inhalation into the lungs. That tuberculosis of the intestine does occur is well known. But if this were in most cases the method of entrance, and were the intestine the site of the primary lesion, the amount of infantile tuberculosis should have decreased with the use of sterilized milk, which has not been the case. Tuberculosis of the mesenteric glands is much less frequent than that of the bronchial and mediastinal glands. Within the last few months Morst has published his results from injecting the lymphatics in man and animals. He states that there are no communications between the cervical lymphatics, superficial or deep, and the subclavicular or pleural ones. The lymphatic chain which receives the products from the nose, mouth, pharynx, and tonsils opens into a trunk which debouches into the jugular vein. He finds that there are no lines of communication between the intestine and the pulmonary lymphatics. When the lung becomes infected from the intestine the bacilli must pass by way of the blood current. The bronchial glands are almost always the primary source and connected with a pulmonary focus of tuberculosis. Escherich believes that living with an adult phthisis case is generally the cause of the pulmonary infection, dust or droplets being the method of carriage of the bacilli. In a few cases the germs may be carried by the hands into the mouth. During the last eighteen months the author has studied nineteen cases of tuberculosis in infants under one year. In all these cases the intestinal glands were affected, generally swollen or caseous, but all these children may have swallowed the bacilli in their own sputum. Tuberculosis occurs in the intestines in about one-tenth of the cases. Aerogenous infection is by far the most frequent.

Pulmonary Tuberculosis with Cavities in Children.—E. Gaujoux and Brunel (*Ann. de Med. et Chir. Inf.*, June 15, July 1 and 15, 1909) comment upon the supposed rarity of cavities in pulmonary tuberculosis in children. They find that this is not a rare condition at all. The diagnosis is not easy to establish. In 1,000 autopsies on children there was tuberculosis in 360; in 250 tuberculosis was the direct cause of death. Marfan considers that many cases of tuberculosis in adults are the result of recrudescence of apparently healed tuberculosis of early life. The younger the child the more diffused is the tuberculosis, the more organs are attacked. The authors examined a large number of cases of cavernous pulmonary tuberculosis and give the histories of a number of typical ones, with a summary of fifty. There are three classes of cases with parenchymatous cavities; caseous pneumonia which causes large cavities lined with masses of degenerated tuberculous material; rapid bronchopneumonia with or without general miliary tuberculosis, and chronic tuberculosis of the lungs with a tendency to cicatrization. Chronic tuberculosis rarely occurs, and causes cavities in the regular course of its evolution. In bacillary pneumonia causing death, several large cavities are frequently found in the substance of the lungs, resulting from the softening of large masses of caseous tuberculous tissue.

Diagnosis and Treatment of Tuberculous Glands.—Arthur Latham (*Clin. Jour.*, July 14, 1909) says that whether we are dealing with tuberculous, pneumococcic, staphylococcic, streptococcic, gonococcic, coli, or other microbic infection, the diagnosis depends upon the proof that the particular microorganism is present, and that its toxin is being absorbed to a greater degree than the resistant forces of the body can deal with adequately; while the tntreatme depends upon placing the patient under the best possible conditions for increasing the natural capacity of the body to resist disease, and upon the inteligent use of tuberculin. While it is possible to diagnose the presence of tuberculous glands upon purely clinical considerations in a large number of instances, we may safely base our diagnosis upon the results obtained from injections of Koch's old tuberculin or from a series of determinations of the opsonic index, a single determination sometimes being sufficient. If we massage a gland gently for a sufficient time, say half an hour, more lymph and blood passes through the gland in that space of time than when the gland is at rest. If we take the opsonic index before massage, and again when this procedure is finished, and again an hour or two later, we will find that in the case of a normal healthy gland the indices are approximately the same, *e.g.*, 1·1, 0·9, 1·0. If the gland is tuberculous, the indices will show considerable fluctuations; it may be that as the result of the larger quantity of toxic products thrown into the criculation by massage the index is raised for a time, or it may be that it is depressed.

Treatment of High Dorsal Pott's Disease.—According to W. E. Gallie (*N. Y. Med. Jour.*, July 3, 1909), the treatment of high dorsal Pott's disease is always a matter of considerable difficulty. The explanation lies in the fact that the distance between the kyphosis and the top of the thorax is so short that any plan of treatment that depends upon pressure backward on the upper dorsal vertebræ to support the weight of the head and shoulders necessarily fails because of the shortness of the leverage provided. The plan of treatment described was devised as a means of getting over the mechanical difficulty presented. The idea involved is the lengthening of the short upper lever by adding to it the cervical spine. Inasmuch as it is impossible to apply pressure on the front of the neck, owing to the presence of the larynx and vessels, the splint must be extended up to the head and preferably to the forehead and occiput. It consists of a plaster jacket extending from the pelvis to the head, leaving free the arms and exposing the face, ears, and part of the chest. The method of application of the jacket is described in detail.

Subacute Meningitis in Connection with Affections of the Respiratory Organs in Children.—Clement Delfosse (*Jour. des Sci. Méd. de Lille*, June 26 and July 3, 1909) says that meningitis, when it occurs in connection with diseases of the respiratory organs in children, has a very rapid evolution. Purulent pleurisy and pneumonia are the diseases which are especially liable to this complication. There is usually a previous history of digestive and respiratory disturbances, or of eruptive fevers. Aside from this vulnerability of the child, the especial virulence of the microorganisms seems to be the cause of the complication. The meningitis occurs early in severe attacks of lung trouble, and later in slighter attacks. The cerebrospinal fluid is always turbid; the more turbid it is the worse the prognosis. There is generally polynucleosis. The pneumococcus is generally the microorganism that appears as the cause of the meningitis, and is found in the cerebrospinal fluid. Next in frequency is the bacillus of Pfeiffer. The examination of the blood will aid in the prognosis; increase of leucocytes and polynucleosis indicate a severe case and bad prognosis. The cerebral lesions are most marked on the convexity of the cerebrum. The prognosis is very grave and treatment has little effect.

Rapid Method of Examination of the Stools of Nurslings and Infants; Appreciation of the Biliary, Intestinal, and Pancreatic Functions.—H. Triboulet (*Jour. de Méd. de Paris*, July 17, 1909) recommends a rapid and correct method of examination of the fresh stools of infants and children, which tells us the condition of the biliary, pancreatic, and intestinal functions. The test is made by mixing a portion of the stool with distilled water and agitating it in a test-tube. There are then added eight to ten drops of a solution of sublimate in acetic acid and distilled water. The tube is set upright and kept for one-half to two hours, or, still better, for twenty-four hours. In normal infants there is produced a rose-colored fluid with a troubled portion above and a rose-colored precipitate. Such a precipitate always indicates normal function of the digestive tube and liver. But in abnormal conditions green and other shades appear instead of rose. The coloration is due to oxidation of the bile pigments. In the early life of the nursling, a normal green coloration may be obtained, but as he grows older this is never a normal reaction. The rose color is that of hydrobilirubin. The nursling at the breast without fever gives a green to a rose reaction. An older infant gives a vivid green precipitate with a rose-colored troubled liquid when he has plenty of bilirubin in the intestine, or when the intestine carries out energetic oxidation, or when it is insufficient for the reduction of hydrobilirubin. A light green or yellow to gray color indicates insufficiency or poor quality of bile or that the intestine is altered in its oxidizing and reducing cellular elements. A white deposit indicates absence of bile or absence of intestinal function. These latter reactions indicate a grave lesion of the digestive tract. A change of the reaction indicates a prognosis for the recovery or death of the subject. A change of feeding may be indicated and may cause an immediate change in the reactions. Another element aids in diagnosis and prognosis, the troubled condition of the liquid or its clearness. The floating particles consist of albuminoid and fatty substances and myriads of bacteria; this indicates normal intestinal and pancreatic condition, while in atrophic infants a clear liquid is seen indicating a grave loss of function. In febrile cases absence of pigment from the stools is a grave symptom. A green reaction may indicate a catarrh or irritation of the intestine. Its persistence is unfavorable, while the return of a normal rose is favorable. Thus this reaction is of value in diagnosis and prognosis, and in giving indications for treatment.

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ORIGINAL COMMUNICATIONS.

THE INVOLUTION OF THE PUERPERAL UTERUS, WITH SPECIAL REFERENCE TO THE INVOLUTION OF ITS CIRCULATORY SYSTEM.*

BY

JAMES R. GOODALL, B. A., M. D., C. M.

Associate in Gynecology and Gynecological Pathologist at the Royal Victoria Hospital, Montreal; Demonstrator in Gynecology, McGill University, Montreal.

(With eleven illustrations).

THE study of the involution of the puerperal uterus has proved an attractive subject to nearly all obstetricians as far back as the fathers of medicine. Accordingly there results upon this subject a literature almost without end. Though so much has been written upon the involution of the uterus proper, the study of the involution of its arterial and venous systems has occupied but few investigators. For this reason, but chiefly also owing to the cloud of mist that seems to envelop this subject, I have devoted my attention to the circulatory changes especially, rather than to those of the uterine elements proper. But to treat of the vessels exclusively would not only be a great error, but almost an impossibility. Hence the uterine wall with its three component tissues will also be discussed, but necessarily more summarily.

A short review of the literature upon this subject will probably have for effect the virtue of conveying an idea as to how far our knowledge, gathered from previous writers, will carry us.

Until 1890 practically all authors were agreed that the puerperal uterus underwent fatty degeneration as a chief means for bringing about its required involution.

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*A preliminary report of a work, now well advanced, upon the circulatory system of the genitalia. From the Pathological Institute of the Friedrichshain Krankenhaus, in Berlin. It is regretted that the original colored plates have had to be replaced by photographic reproductions. The original plates will be found in the German publication.

This was taught and generally accepted as subject beyond debate. But the extent to which this fatty change went gave rise to bitter controversy, resulting in the extreme views of Heschl on the one hand and in those of Luschka on the other, and in those of an intermediate school headed by Kölliker. The three schools held the following doctrines:

Heschl, in an exhaustive work, claims that the muscular fibers of the uterus undergo a complete fatty degeneration, so much so that of the fibers which constitute the uterus at the beginning of the puerperium, not a single muscular cell remains when involution is complete, *i.e.*, when the uterus has reached the stage of hyperinvolution.

This degeneration begins, according to Heschl, not before the fourth or sixth day postpartum, and never later than the eighth. With the progress of the fatty degeneration the uterus becomes more and more brittle and soft, and it remains so until all parts of the uterus have reached a like stage of degeneration. Usually regeneration of tissue does not begin until the fourth week and should be complete at the end of the eighth.

He adds: "Puerperal fever from whatever cause stops or retards the retrogressive changes in the uterus. The infection may originate in, or be apart from, the uterus; but the result is always the same."

In this connection Heschl states that under the influence of infections regeneration of tissue may begin, when degeneration is incomplete, but that the newly constructed fibers instead of developing to maturity undergo a second fatty degeneration. This is the cause of the prolonged softness and easily tearing condition of the uterus, so frequently found following puerperal fevers. In his own words "this condition of the uterus is the effect of an improper reconstruction of the uterine elements."

With Heschl all the uterine fibers are destroyed, so that when the uterus is completely restored it contains not a single fiber of those which made up its bulk at the beginning of the puerperium; with Luschka not a single fiber is lost to the economy. According to the latter's views the involution of the puerperal uterus consists essentially in a rapid reduction in the size of the individual fibers, each of which during pregnancy had taken on great increase in length and breadth. A fatty degeneration of the muscle fibers takes place, beginning a few days after labor and appearing at first as fine granules about the nucleus. The granules gradually grow more abundant and equally gradually disappear without it being possible to ascertain in what way they are removed from the affected cells.

Kölliker and his school contend that there is certainly and plainly a reduction of the fibers during involution; that this takes place chiefly through fatty degeneration; that this is undoubtedly the chief means by which the reduction of the uterine dimensions is brought about. "But," he adds, "it is just as certain that many of the fibers do completely disappear through this fatty change."

To quote from Dittrich: "These three views upon the fate of the uterine muscle were held until a few years ago without any new opinions being put forth to substantiate or refute any one of them. Still authors generally in text-books and in other publications inclined to the belief that a fatty degeneration takes place and that some fibers disappear completely in this change."

In 1884 a new work by Meola advanced the new theory that the involution of the puerperal uterus takes place through a simple granular atrophy of the muscle fibers—a condition brough about not by the uterine contractions and retractions, but by the hypertrophy of the sheath of connective tissue surrounding each muscular fiber. Meola's work found few supporters, and Dittrich asks, "Is it not to be assumed that Meola's cases were patients who had died of puerperal sepsis or other such a condition arising locally and accompanied by high fever?"

In 1888 Sänger, in an exhaustive and important work upon this subject, came to the conclusion that the involution of the puerperal uterus depends upon several factors. Chief among these are increased oxidation, the continued contraction and retraction of the uterus, and lastly the relative anemia of the organ, all three of which give rise to a fine granular, cloudy, hyaline and fatty degeneration of the protoplasm of the muscle cells, which, after absorption of these products of degeneration, return to their former size without a single cell being necessarily destroyed. The chief object for these protoplasmic changes consists, according to Sänger, in the reduction of the size of the muscle fiber so that the uterus may return to its normal dimensions.

Dittrich, in a work published in 1890 upon the involution of the puerperal uterus under pathological conditions, gives a full review of the work of previous authors and comes to the conclusion that in most, if not in all, of their cases there entered as disturbing factors pathological processes, which necessarily detract from the value of their conclusions. He will not allow that they should be accepted as works upon the normal involution. He states that most of these works were done before the days of asepsis and that the authors do not state the cause of death in the cases reported.

Dittrich's work, carried out upon a large amount of material, led him to the conclusion that pathological processes either starting locally in the pelvis or in other parts of the body produce either a complete block or at least a marked retarding influence upon the changes involved in the involution of the puerperal uterus. "*But,*" he also adds, "*pathological processes such as puerperal fever or general acute or chronic diseases have no effect upon the changes of involution except that of rendering the process slower and of causing frequent destruction of tissue by abscess formation and infiltration.*" He supports Sänger in the belief that during involution fibers are not completely destroyed, but that they simply reduce their dimensions. He also found hyaline degeneration of the muscle fibers as did also Beneke in many of his cases.

Such is a short review of the history of the involution of the puerperal uterus.

If the authors who have occupied themselves with the body of the uterus are numerous, the number of those who have done work upon the changes in the arteries of the puerperal uterus is correspondingly small.

The first work to appear upon the subject was that of Balin, in 1880. He busied himself chiefly with the arterial changes, and as it forms the basis of the subsequent work I will allow myself to quote quite freely from his article.

After explaining that the arteries reduce their size by contractions of their muscular wall he states that they further reduce the size of their lumen by a growth of fibrous tissue in the intima. He writes:

"One finds, about ten to sixteen days after labor, here and there localized ingrowths of the intima which are variously disposed. At times but a single growth extends into the lumen, causing the latter to take the shape of a new moon. By multiplying these ingrowths, all sorts of deformities of the lumen may be seen. Frequently its caliber is so reduced by these ingrowths that it is barely visible, and not infrequently complete occlusion may follow.

"But the growth of fibrous tissue does not always infringe upon the lumen of the vessel. At times it grows into the media, which in consequence of this pressure undergoes atrophy and is replaced by elastic tissue."

He also states that the media of the blood-vessels undergoes the same fatty degeneration as the uterine musculature, but that the fatty change appears later and lasts longer than the corresponding changes in the uterine muscle fibers.

In short, his conclusions are as follows:

"In the vessels of the uterus undergoing involution there take place simultaneously two types of changes: on the one hand an increase of the fibrous tissue of the intima, at times growing into the lumen, at other times growing into the media and resulting in a more or less narrowing of the vessel even possibly to complete occlusion; on the other hand a partial or total fatty degeneration of the media. The cervix shows no such obliterated vessels."

He continues further:

"The vessels of the placental site are without doubt closed by the building of a thrombus. In an uterus of a woman who died shortly after labor I found several of these thrombi in which spindle-celled fibrous tissue from the intima had started a slow organization."

"This newgrowth of fibrous tissue gradually replaces the thrombus, and in late specimens I have been able to distinguish here and there in the mucosa these white spots containing a few fibers—the remains of the organized clot."

After referring to the narrowing of the veins through thickening of the intima he wrote:

"What happens to the many small capillaries and veins after delivery? I must fully agree with Heschl that the majority of them are compressed by the uterine contraction and retraction so that a circulation no longer obtains in them and that they afterward disappear through fatty degeneration."

Szasz-Schwarz, in 1903, described uteri of women who had borne children. In these he found changes about the vessels which he characterized as typical of pregnancy and still other changes typical of general arteriosclerosis.

The changes characteristic of pregnancy were in the main a great increase in the elastic tissue throughout the uterus and thick pads of the same tissue about the smaller vessels of the inner and middle third of the uterine wall.

This mass of elastic tissue at times surrounds the vessels on all sides, while at other times it encircles but a portion of the vessel, often presenting the appearance of a crescent with the vessel in its concavity. This pad of elastic tissue is, as a rule, sharply defined both on its outer and inner borders. In the case of some vessels it lies in immediate contact with the outer part of the media, whereas, in the case of many other small vessels, a thin layer of fibrous tissue intervenes between them. These elastic deposits often reach a very great thickness, often eight times that of the vessel wall which they enclose.

In 1906 a work by Pankow appeared in which he corroborated the findings of the former writer and added to our knowledge of the uterine arteries. After describing the arterial changes found in the uterus long after pregnancies had ceased, he endeavored to find an explanation for these by an examination of the uterus of a woman who had died shortly after delivery. His findings are of great interest in that they bear directly upon my work and I take the liberty to quote rather freely from his article.

After having described the arteries of the uterus of a multiparous woman and having substantiated the findings of Szasz-Schwarz relative to the marked sclerosis which follows pregnancy, he writes:

"Even though the vessel changes in pregnancy and in the subsequent involution have been material for research, yet no adequate explanation as to how and why this sclerosis occurs has been given (at least none in the German literature)."

His own researches, based upon one case, led him to the conclusion that the media disappears more or less through fatty degeneration and is replaced by elastoid tissue. Coincident with this, a proliferation of the intima takes place, similar to that of all *thrombosed vessels*.

"Generally in the periphery of the thrombus, there is a part of the lumen not involved in the thrombosis, *in which portion by a growth of endothelium a new endothelial lining is formed which constitutes the inner* limits of the lumen. According to the demands of the organism, the new endothelial lining can differentiate itself into a new vessel." He continues: "This process can occur, I think, without a foregoing complete thrombosis of the vessel. But why even in the submucosal layers one should find such tremendously thickened elastic deposits which lead to hyaline degeneration of large areas, is difficult to explain. For the placental area the wandering in of fetal syncytial cells certainly plays a rôle, but that it is not the only factor is shown by similar changes in the vessels outside the placental area.

"Therefore there must be a physical or chemical cause to explain the occurrence of these changes. Such may be found in the great stretching and prolonged soddening of the vessel walls during pregnancy and labor."

Before starting the description of my researches it may be well to state precisely the characters and quantity of material at my disposal and the methods that were used in the examination. This material was drawn from the autopsies at the Friedrichshain Krankenhaus, Berlin, and from the operations in the same institute. The work was carried out in the pathological department of this hospital and I take this opportunity of thanking the members of the staff and my colleagues in the laboratory for their kindness in assisting me in collecting the material necessary for this work.

Material.—I have examined in all eighty uteri, among which are six from women who died at variable periods within ten months after labor. The cause of death in all of these cases was not of pelvic origin, and the pelvis was always free of any disease whatsoever. Among these eighty cases were many who had not reached puberty. These I disregarded completely. There were also ten nulliparous cases between the ages of fifteen and thirty-three and one of seventy years. Also thirty-three cases of parous women in whom one to forty years had elapsed between the last pregnancy and the time of death.

Technic.—The tissues were hardened *en bloc* for forty-eight hours in a 10 per cent. solution of formalin; after which blocks 3 mm. thick, extending in each case from the peritoneal to the mucosal surfaces and of variable size, were taken for examination. Sections were taken in each case from the fundus, body, and cervix, and from the uterine artery in its course through the broad ligament, or as it coursed up the lateral wall of the uterus.

These tissues were then brought into 50, 75, 96 absolute (commercial) and copper-sulphate absolute alcohol respectively, the whole process lasting from two to three hours. They were then placed in three changes of pure xylol until transparent, and then through soft and hard paraffin.

The tissues, so handled, were cut with the greatest ease upon Leitz's new sliding microtome and none were cut thicker than 10 mm. and many as thin as 6 mm.

The tissues were stained in: *Routine.*—Hematoxylin and eosin, Weigert's elastica, Weigert's elastica and Van Gieson, Weigert's elastica and hematoxylin and Van Gieson, *Special.*—Orcein and hematoxylin, Weigert's Markscheidefärbung Methode, Soudan III and hematoxylin.

In using Weigert's elastica stain I left the tissues overnight in the stain and then decolorized in 1 per cent. acid alcohol, and then washed thoroughly in running water before staining with hematoxylin or with Van Gieson. By so doing, all the acid is removed from the tissues and the Van Gieson becomes a much truer and more permanent stain.

My subject is divided into the following heads.

1. The nulliparous uterus.
2. The multiparous uterus.
3. The puerperal uterus: Normal involution; abnormal involution, or subinvolution.
4. Discussion.
5. Conclusion.

1. *The Nulliparous Uterus.*—I have taken for description the uterus of a nulliparous woman of twenty-seven years of age. Whatever the age of the patient after the age of puberty, the three elements, muscular, elastic, and fibrous are always found conforming to one type, bearing the same relation to one another though differing somewhat in relative quantities. Especially does this latter apply to the elastic elements. So marked can be the increase in elastic tissue in the nulliparous uterus that it can rival that of a young uniparous uterus that has gone through a normal and rapid puerperium.

For purposes of description I have adopted the old but useful division of the uterine wall into thirds—the subperitoneal, the vascular, and the submucous.

In the middle third or vascular zone the largest vessels are found. These are made up of I, intima plus elastica interna; II, media, and III, adventitia.

The Intima.—In the case of the larger vessels a well-defined endothelial lining and in all, except the smallest, a well-marked elastica interna is to be found. The latter varies in thickness, one may say, proportionately with the size of the artery.

In the largest vessels on cross-section the elastica interna presents a homogeneous corrugated band. But even in these same vessels, slanting sections of the arterial wall demonstrate that this so-called membrane is made up of parallel fibrillæ which course parallel with the long axis of the lumen. Fenestra of several sizes with well-defined margins can be readily seen, and through them the elastic fibers and muscularis of the media can be seen. In vessels of smaller caliber the interna is seen on cross-section as a ring of black dots more or less widely separated from one another. The interstices between them are not infrequently filled by a fine black membrane which is visible only with high powers. Slanting sections of such vessels demonstrate the fact that here the longitudinal fibers are widely separated and thereby constitute a very imperfect membrane about the vessel. The chinks are relatively narrow, but are always of considerable length. Branches leave the main stem at an acute angle and pass across these open spaces to join a neighboring fiber. At the point of division and of junction a swelling of the fiber occurs. As a consequence of this branching the defects in the membrane are usually long, narrow, acutely-pointed slits.

If we examine the individual fibers of such a membrane (not in all cases is this shown) in a case of chronic Bright's disease we find that each fiber presents throughout its course two black parallel lines with an intervening lighter colored space. The same description holds good for the branches. To explain this one has but to examine a very thin cross-section of such a vessel and one finds with the oil-immersion that each fiber is a cylinder which, in a plain Weigert's elastica stain, has a black contour and a pale Nile-green center.

In many of the vessels, especially in those of larger size, a second elastica interna concentric with the first is not infrequently found. It never completely surrounds the lumen, but at most only one-half of it. In the interspace between the two layers of elastica muscle fibers, which course in a direction parallel with the long axis of the vessel and therefore at right angles to the fibers of the media, can be seen with very great ease. Between these elastica interna layers, a minimal amount of fibrous and elastic tissue in very fine strands is seen surrounding the individual muscular fibers and binding the two layers of elastica interna together. This layer constitutes the so-called "hyperplastic intimal layer" of Jores.

The Media.—The media, relatively stout for the size of the lumen, contains a considerable number of wavy elastic fibers, which, coursing concentrically with the elastica interna, never surround more than a fraction of the circumference of the vessel. Radially and diagonally disposed fibers are also found in more or less large numbers. Fibrous tissue fibrillæ follow the ramification of the elastica and these two tissues surround each muscular fiber with a more or less perfect sheath.

The Adventitia.—The outermost layer of muscle is sharply bounded by the adventitia made up of wavy hyaline-looking fibrous tissue. The thickness of the adventitia in the vascular zone corresponds rather closely to that of the media which it encloses; though many exceptions are found. The fibers of the adventitia pass over in bands of varying size into the interfascicular tissue, which in turn breaks up into smaller bands and fibers to eventually surround each muscle fiber of this zone with a sheath of connective tissue.

The amount of elastic tissue in the adventitia of the average case in minimal and an elastica externa does not exist even about the largest vessels. The small amount that is found in the adventitia is usually circularly disposed about the vessel and from these fibers pass off into the uterine musculature and follow the fibrous tissue to its minute ramifications about the individual muscle fibers of the uterine wall.

The veins in this zone present no uniform arrangement of muscle, elastic and fibrous tissues. Suffice it to say that the elastic tissue in their walls, relative to that contained in the walls of the arteries, is abundant and it supplies most of the fibers which constitute the elastic framework of the uterine body.

Outer or Subperitoneal Zone.—In the outer third of the uterine wall immediately under the peritoneum a layer of fibrous and elastic tissue with a few muscular fibers in the interstices, surrounds the whole uterus. It is of uniform thickness and from it numerous stout bands pass radially between the underlying muscular fasciculi, giving branches to these and finally reaching its finest divisions in the vascular zone. Not infrequently relatively stout bands bind the perivascular elastic tissue of the middle zone with this subperitoneal fibro-elastic layer.

Between this layer and the underlying thick muscular bundles, whose fibers generally run at right angles to those of the former, it is not infrequent to find a row of fine dots arranged in linear exactness, which sharply divides the fibro-elastic subperitoneal bands from the underlying muscular tissue. Seen in slanting sections this row of dots is made up of a single layer of parallel elastic fibers similar in every respect to the elastica interna of an artery. The radially disposed elastic bands passing from the peritoneum to the deeper tissues penetrate its fenestræ. The elastic tissue is accompanied even in its finest divisions by fibrous tissue.

There is a marked tendency for the vessels in this zone to arrange themselves into layers which alternate with compact strands of muscle fibers.

The description of the vessels of the vascular third applies to those of this zone in every detail.

The Submucosal Zone.—Among the striking features of this third of the uterine wall are the bizarre shapes that the lumina of the vessels assume; the inordinately thick media in vessels of relatively small caliber; the marked tendency for the vessels to run in a corkscrew-like course from the vascular zone to the mucosal margin and the tendency also for them to run in groups with wide interspaces almost devoid of vessels.

The elastic interna in the vessels in the deeper parts of this zone is as a rule delicate and very imperfect, though special groups show it well developed. In this area one practically never finds a development of the "hyperplastic intimal layers of Jores" as seen in the larger vessels of the vascular zone. As one approaches the mucosal boundary one finds that in most of the vessels (isolated groups frequently do not show this change) the elastica interna grows markedly stouter. In many of these the margins of the elastica interna become ill defined and the membrane itself in consequence becomes markedly increased in thickness. Not infrequently in such vessels a new, but poorly formed elastica interna lies inward to the old one and poorly defined from it. In such vessels the delicate elastic fibers of the media become much swollen. If we follow such a group of corkscrew vessels upward into the mucosa one finds its terminals involved in a marked sclerotic change—the sclerosis of menstruation—and one realizes that these vessels lying deeper in the muscularis are but arteries that are involved in the same functional sclerosis. Necessarily the change is less marked the farther one recedes from the mucosa, where in the finest ramifications of arteries and veins the process shows itself in its most marked characters.

I do not intend here to enter upon the changes characteristic of menstrual sclerosis, for it is a subject somewhat foreign to the main purpose of this work. Suffice it to say that the signs of swelling of the elastica interna and the attempt at reduplication of the same and the swollen appearance of the elastic fibers of the media as above described are but means to an end, and that end is to bring back to its original size the vessel which became enlarged and hypertrophied during the premenstrual and menstrual periods.

The adventitia of the vessels of this zone lies directly in contact with the media. It is of fibrous issue with a minimal of elastic, both of which tissues pass over in strands to the uterine musculature to end again as in the other zones about the individual muscle fibers of the uterus.

Contrary to the results of previous writers, I have found fine elastic fibrils about the muscle fibers in the inner third of the uterine wall. Previous writers have denied their existence except in the immediate neighborhood of the vessels. But it has never failed in all my cases above fifteen years of age.

Age has practically no influence upon the relations of the three tissues of the nulliparous uterus, but age, as pointed out above, does cause the elastic and fibrous tissues to increase; the former before and the latter more especially after menopause.

The Multiparous Uterus.—To build a contrast between the nulliparous uterus on the one hand and the parous uterus on the other, I have chosen a case which corresponds most closely to the type which Szasz-Schwarz and Pankow regard as being characteristic of parity, and proof positive that the woman had borne at least one child. So characteristic are these changes that these authors together with Balin state that it is possible in every case to tell whether an uterus had held a fertilized ovum or not. To this question I shall have occasion to revert at a later period.

The patient from whom this specimen had been removed had borne five healthy children. She died at the age of thirty-one of pulmonary tuberculosis.

A mere glance at these sections suffices to show how enormously the elastic tissue has increased not only about the vessels, but throughout the uterine musculature generally. Naturally the bulk of it in most cases concentrates itself about the vessels and in the regions immediately below the peritoneal surface. But most striking of all, the region in which in the nulliparous uterus the smallest quantity of elastic tissue was found, *i.e.*, the inner third of the uterine wall, now displays large perivascular deposits that are quite the most characteristic signs of a previous pregnancy.

The Subperitoneal Zone.—Below the peritoneal surface, and for a considerable distance inward, the elastic tissue has taken on a marked increase. It tends somewhat to concentrate about the vessels though the elastic tissues about the individual muscle fibers are also very greatly augmented. The vessels in this zone show a still more marked tendency than in the nulliparous to arrange themselves in layers parallel with the peritoneal surface. Where the elastic and fibrous tissues—the former always in much greater amount than the latter—tend to gather about the vessels, the individual fibers lose their normally well-defined boundaries, appear swollen, and large strands of this elastic tissue pass from vessel to vessel or into the adjacent muscular tissue.

The vessel itself in the midst of this mass of tissue frequently has a well-defined muscular coat with a delicate, often imperfect, elastic interna, but quite as frequently the media is rich in poorly matured elastic tissue and generally in such cases the elastica is inordinately thick and presents ill-defined margins. The veins present thick walls, composed of a confused mass of elastic, fibrous and muscular tissue, without the slightest pretence at order or layer-formation. The elastic tissue constitutes the major part of the bulk of the wall of the veins.

Vascular Zone.—In the vascular zone the vessel walls, somewhat thicker than normal, bear a very large amount of elastic tissue in their media. So great is this replacement at times that but traces of the muscular elements may remain. The arrangement of this hypertrophic elastic tissue conforms rather closely to the normal disposition of elastic tissue in the media, but it is so swollen and its fibrillar margins so ill-defined that it constitutes when stained with hematoxylin a more or less uniform hyaline colorless mass with shrunken muscle cells in its interstices.

The elastica interna is usually composed of many concentric layers. These are very thick and present between them a (with Van Gieson) reddish hyaline tissue which, owing to its staining properties, has been interpreted as hyaline fibrous tissue.

The number of reduplications of the elastica interna seems without limit, and it may go on so as to almost completely obliterate the lumen. The admixture of elastic and fibrous rings presents a very striking picture in which muscular elements are almost entirely absent. At times this intimal hypertrophy seems to impinge upon the media causing it to disappear in which case the adventitia and hyperplastic layers of elastica interna meet. At other time the supernumerary elastic rings seem to serve only to reduce the lumen.

The adventitia instead of being elastic-free as in the nulliparous uterus is now a huge mass of coarse fibrils of the tissue without at times even a trace of fibrous fibers.

Thick strands pass over into the interfascicular tissues to again ramify and surround the individual muscle fibers with a thick collar of elastic tissue. Thick strands also pass from vessel to vessel and from zone to zone.

The veins present very irregular lumina with variously shaped tags or buds projecting into them. The elements that go to make up the walls of such veins vary very widely. At times the wall and its inward juttings are made up almost wholly of elastic tissue, at other times it is almost absent. All intermediate types between these extremes may be found.

The Submucosal Zone.—The submucosal zone of the uterine wall contains the signs that are most characteristic of a previous pregnancy. The larger vessels of the deeper parts of this area present the same characters as those of the previously described zone. The elastic and fibrous elements throughout the musculature are markedly increased over that of the nullipara. But the most characteristic sign of the parous uterus consists in a thick collar of elastic tissue which surrounds the weak walls of the small arteries.

A glance at Figs. 1 and 2 suffices to give one an accurate idea of the relation of this tissue to the vessel.

The muscular media of such a delicate vessel is frequently quite free from elastic fibers, and an elastic interna may or may not be found. At other times the media is almost replaced by elastic tissue, and when such is the case the elastica interna is not infrequently very hypertrophic. The collar of elastic tissue outside the small vessel may encircle the latter completely, or may be crescentic in character. Not infrequently it surrounds two such delicate vessels without penetrating between them. The tissue, which composes this collar or pad, has interesting features. In the first place it, is as a rule, well defined on both sides, and becomes very conspicuous by its isolation in a tissue relatively free from stout elastic tissue; it sends very few fibers off from its outer margin; internally it either lies in immediate contact with the media of the small vessel or a thin layer of fibrous tissue intervenes; the tissue itself stains a dark green with Weigert's stain, thereby contrasting somewhat with the black of actively functioning elastica; it is made up of twisted, knarled fibers, which seem swollen, and a few nuclei can be made out in its interstices (Fig. 1).

From this rather full description it will be seen that the changes in the uterus, and especially about its blood-vessels, due to pregnancy, are very complex—so complex that one hardly knows where to begin to give an adequate word-picture of them and what to choose as being the nearest approach to the common types.

The case which I have described corresponds very closely to the descriptions given by Pankow and Szasz-Schwarz, as stated above. They differ only in minor details which do not appreciably alter the character of the changes.

If we ask whether these changes are characteristic of pregnancy our answer must be a rather guarded one. That a great number of pregnancies are followed by such changes, further that in the great majority of cases exhibiting such changes, pregnancy has been the causative agent, must be admitted. But I see no reason for not assuming that allied conditions such as fibromata of the body of the uterus, especially a large submucous fibroma, could produce the same vessel changes after the removal of the tumor. But a much more weighty question is: Are these changes a necessary sequence of pregnancy? In other words: Must every woman who has born a child present the changes described by the previous writers as typical of a parous uterus? My answer must be emphatically in the negative. That there are minor differences between the parous and nulliparous uterus in my series, I am prepared to admit. But among the thirty-three parous uteri sixteen were of women beyond forty-four years of age. These all show changes which would leave no doubt in the mind of a microscopist that he had to deal with parous women. Among the remaining seventeen cases were two, one of whom had had two living children, the other a miscarriage followed by a living full term child. These show no departure from the average nulliparous uterus except the slightest general increase in elastic tissue throughout the uterus. The vessels, examined in sections from all parts of the body of the uterus in the hope of finding so-called pregnancy sclerosis in the spot where the placenta was implanted, showed not a trace of that change. The patients were twenty-one and twenty-seven years respectively, and one and a half and one year, respectively, had elapsed since their last delivery. I wrote above "show no departure except a slight increase in the elastic tissue over and above that of the average nulliparous uterus." Let me add a factor that makes the question a still more difficult one to decide, viz., that the amount of elastic tissue in the uteri of nulliparæ is a variable quantity, and I have found several in my series that quite rival these two cases of parous women.

Moreover, if it has so happened that in my series of seventeen cases of women in their full sexual life two have shown such almost complete return to the normal state, it is quite within the domains of theory to assume that in a larger series cases would be found in which after pregnancy not even this slight increase of elastic tissue would be found.

Why there should exist such differences between the uteri of parous women; why one should return almost to its virginal state while another shows such marked departure from that state, are questions which I hope to be able to answer by drawing conclusions from a careful examination of a large amount of material.

THE PUERPERAL UTERUS.

CASE I is that of a woman of thirty-five who died of eclampsia forty-four hours after delivery.

The uterus was of the size that is considered about normal for that stage. The cavity was free and the placental site healthy.

Before proceeding to the description of the cases, let me again state that when not otherwise stated my descriptions always refer to specimens stained by the triple method of Weigert's elastica, hematoxylin and Van Gieson, or to Weigert's elastica with Van Gieson. These two methods I have found by much the most serviceable.

Sections from the placental and extraplacental areas to the peritoneal surface show that already fatty degeneration of the tissues has begun. This degeneration is not uniformly distributed throughout the uterine wall, but strands of muscle fibers seem already filled with fat droplets while others immediately bordering upon these show but a general cloudiness of protoplasm. The parts most affected are the torn mucosal surface and the decidual cells of the remaining mucosa. Especially does this apply to the placental area.

With hematoxylin and eosin preparation the tissue of the whole uterine body presents a cloudy appearance and the immediate subplacental area shows well-marked signs of cell disintegration.

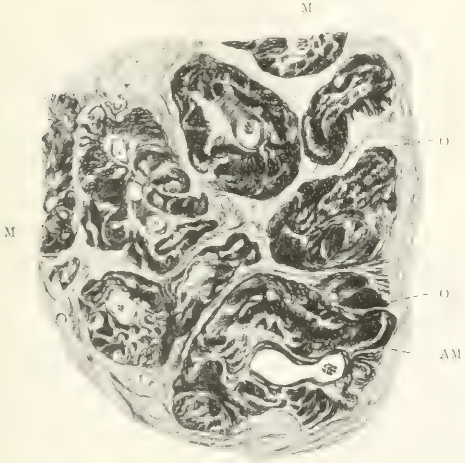

FIG. 1.—The appearance of vessels of the inner third of the uterine wall of a parous woman. The new vessel lies in a mass of black elastic tissue, *a. m.*, in which the remnants of the old media are occasionally seen. *m.* New muscularis of vessel with a delicate elastica interna. The space between the new media and the outer mass of elastic tissue is filled with a fine fibrous tissue. This is at times absent, when the elastic tissue comes to lie directly upon the media.

In this region are numerous well-defined clots, which lie in close contact, with but a minimum of fibrous strands between them. The clots in most cases are laminated with fibrin and contain few if any more than the normal percentage of leukocytes. One frequently finds that the laminæ start from a definite spot in the vessel wall, as if coagulation had begun there and had gradually spread to involve the whole lumen. Not a few of the vessels present irregular areas about the clot, between it and the vessel wall, where fresh blood circulated at the time of death. From the disposition of these channels of fresh blood, and by the fact that the clot remains firmly attached to prominent parts of the wall, which seem firmly drawn into it, I take it that the uterus during the progress of the eclampsia had relaxed somewhat and caused a separation of the now relaxed wall from the clot. Immediately below the surface mucosa of the placental site, much extravasated blood lying free in the tissues separates the tissue elements widely from one another, but this layer without definite form and arrangement soon gives way to the more normal outlines of vessels and tissues found deeper. The walls of the vessels present a glassy, homogeneous, yellowish blood-stained appearance throughout this mucosal subplacental area. The muscle fibers stain a mottled yellow, and their nuclei are very indistinct. In a word, the mucosal surface in its superficial parts, especially in the placental area, presents all the appearances of dying tissue and is sharply defined below from the underlying musculature of the uterus.

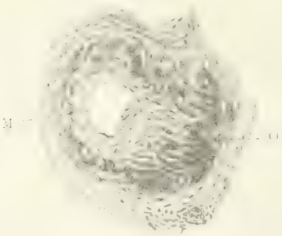

FIG. 2.—Another similar vessel, showing *m.* new media vessel, and *o.* the elastic remnants of the old vessel.

Syncytial cells in the subplacental area are surprisingly few, but possibly they were more numerous at an earlier date in the puerperium, for outlines of not a few are seen; and when faint outline can no longer be recognized, huge masses of nuclear pigment mark the site which they formerly occupied.

One has but to recall the rapid disappearance of syncytial cells in the extravasated blood in metastases of chorio-epithelioma to find a ready explanation for their early disappearance in this zone.

If now we turn our attention to specimens stained with Weigert, hematoxylin and Van Gieson, we find, naturally, the same arrangement of tissue. In the placental area the fibrous tissue of the vessel walls is swollen to huge dimensions, cell outline is completely lost so that the vessel seems surrounded by a homogeneous glassy, hyaline band. Closer examination of this vessel wall shows that throughout its circumference three distinct layers can in most cases be distinguished. The innermost, of a brick-red color, limits the bright yellow blood clot externally. Next is a bright glassy yellow band in which few large oval nuclei are found. Limiting this externally is a third band of bright scarlet, made up also of glassy hyaline tissue. Suffice it here to say (a statement which will be proved later) that these three layers, the brick-red line, the yellow, and the bright red correspond to the altered elastica interna, muscularis, and adventitia, respectively. Several of the smaller veins do not present the band corresponding to the elastica interna. But since it is impossible that all the large vessels in the mucosa of the placental area are arteries I assume that the veins, owing to the free circulation through the placenta and the consequent high pressure in them, have a more or less prefectly developed elastica interna. In some of these vessels the degeneration has not involved the whole circumference of the wall equally, so that parts still retain their former normal staining properties. In such vessels it is easy to trace the transition from black elastica interna to the swollen brick-red line, and by continuing to follow along the circumference one returns again from the swollen brick-red line to the delicate black elastica. The same can be repeated with the other two coats, namely, the media muscularis and the adventitia.

The foregoing description applies to the immediate mucosal subplacental area. A section from the very margin of the placental area presents much the same characters, though degeneration has not gone on quite so rapidly, and in areas cell outline is much better preserved than in the mid-subplacental mucosa. The same description however applies to this region even in its minutest details except that the bands of uterine muscle which invade the mucosa are much more numerous and stouter than those of the central placental area. These also, in comparison with the surrounding areas, are remarkably well preserved. In consequence of these the mucosa in this region seems poorly defined from the underlying uterine muscle.

Sections of the mucosa outside of the placental area show the same glassy hyaline degeneration of the torn surface mucosa. The strands of the torn cavernous layer still remain as tags. The deeper layers of the mucosa are also hyaline though loss of cell definition is not by any means so far advanced as in the parts immediately under the placenta.

If we now turn our attention to the uterine wall proper below the placental site as well as in the regions bordering upon this area, we find in a hematoxylin-eosin preparation that the syncytial cells are relatively numerous; that they lie almost exclusively in the interfascicular connective tissue; that an occasional one is found in the muscle bundles; that they bear no direct relation to, nor lie especially in close contact with, vessel walls; that an occasional one lies in the venous walls; that they gradually grow less numerous, though better preserved the deeper one recedes from the mucosa into the uterine musculature;

that they show all stages of degeneration from the cloudy change, through granular degeneration, loss of cell outline, loss of cell protoplasm, to the stage where nothing but a huge mass of chromatin remains of the former nucleus. The musculature does not stain uniformly with either hematoxylin or eosin, but presents a dirty mottled appearance which now is streaky, now is mosaic-like, according as to whether the fibers are cut in longitudinal or cross-section, respectively.

The fibrous tissue is swollen and hyaline throughout.

But the vessels of this zone present features that are of the greatest interest. The walls of such vessels are thicker than those in the immediate neighborhood of the placental attachment; the elastica interna is more developed and the muscularis constitutes a stout muscular band in which changes can be studied with much greater ease than in the mucosal areas described above.

A rapid glance at such a section of the deeper parts underlying the placenta suffices to distinguish two types of vessels: those which have undergone change before labor and those which have not. The arteries and veins, though affected in very different ways nevertheless show the same tendency to division into two classes. Naturally between the extremes of these two types exist many intermediate stages.

For ease of description, I have chosen to begin with the

ARTERIES WHICH HAVE NOT UNDERGONE CHANGE PREVIOUS TO LABOR.

In the first place, one finds here quite frequently small arteries which as yet show no change whatsoever except a beginning hyaline degeneration and swelling of the connective tissue of the media. But in nearly all of them there is a marked departure from that of the virgin uterus, *i.e.*, the development of a hyperplastic intimal layer, consisting of a reduplication of the elastica interna and a building of a new ring of muscle between them. The largest vessels, namely those which undoubtedly had a great part to play in the placental blood supply, show the first stage of that change which I hope to trace throughout the puerperium.

If we examine such a vessel closely we find immediately surrounding the coagulum—if such exists, or occupying the position of the intima, if a coagulum is absent—we find an irregular, wrinkled thick brick-red band of tissue, of homogeneous hyaline appearance (Fig. 3 is a later stage). If traced about the vessel it is seen to frequently split to reunite quickly, thereby constituting lacunæ filled with a glassy yellow protoplasm in the midst of which a large active nucleus is found. At other parts the brick-red tissue splits and its two portions run long distances, not infrequently for a third or a half of the circumference of the vessel and they then reunite to form a single but stouter membrane. The interspace between these two swollen membranes, which run parallel, is filled with a highly refractile yellow tissue without cell definition in which nuclei that are large, oval, and present all the appearances of being active are to be found.

If we study again other such vessels we find that the changes are not quite so advanced and the intermediate stages can be made out and the brick-red tissue and others can be traced to their origin. In such a vessel the same brick-red line and the intervening tissue is found. But this change does not extent the whole way about the vessel. If we trace the brick-red line in its course, we find that it suddenly ceases, and its place in the completion of the circle is taken by the normal elastica interna (Fig. 3). That the elastica interna becomes so modified in its staining properties, so swollen as to exceed ten times the original elastica in thickness, is a fact that cannot be doubted. Let us examine more closely. If we follow the normal elastica interna to its point of transition into the brick-red line, we find that before losing its normal staining properties it becomes markedly swollen until its extremity as compared with the normal is like a broom to its handle. The thickness of such swollen black elastica is about equal to that of the brick-red tissue. A little further on a remarkable transition takes place. The elastica interna loses its black stain, becomes a dark red, and then grows gradually lighter and lighter until the pale brick-red stage is reached. The intervening yellow tissue lying in its lacunæ and between the parallel brick-red lines, where these are split, are muscular fibers which previously existed either singly or constituting a layer of hyperplastic tissue respectively. I shall have frequent occasion to revert to these two tissues, viz., the modified elastica interna and the enclosed muscular cells.

The relative amounts of modified brick-red elastica and normal elastica that may surround the lumen in such an uterus can vary between the one extreme where the elastica is affected only in a small portion of its circumference to the other extreme where the whole elastic has been changed to the brick-red hyaline tissue. Interesting are those vessels in which but an infinitely small portion of the elastica has lost its staining properties with Weigert and now stains a dark red with the Van Gieson. This is but the first stage of the change, and one can readily see in such a specimen that the dark red color is due to fine dots of black (Weigert)—which are but the remains of the elastic fibers that have not as yet completely lost their tinctorial properties.

Before passing on to the changes of the media it may be well just to add a word as to the origin of the muscle fibers in the substance of the elastica. In discussing this question in his monograph upon arteriosclerosis, Jores found great difficulty in finding an adequate answer. In such a case as that described above, there is as yet not the slightest tendency to cell multiplication,

> and we can assume that the cells here found in the modified elastica interna whether as single cells or as a more or less complete hyperplastic layer, were there before the changes in the elastica started. This I think is not an unjust assumption. Now, I have in several of these specimens been able to trace a muscle fiber from the innermost layer of the media through an aperture (in section, through a loss of continuity) in the inner layer of the modified elastica interna. This I think proves beyond a doubt that these cells originate in the media and from thence they pass through an opening into the sheaths of the elastica interna which they force apart by their increase *in situ*.

The media of such vessels presents also very interesting changes. The muscle cells are hyaline and their small black nuclei, which contrast markedly with the large active-looking nuclei of the hyperplastic layer, present all the features of degenerating cells. They contain fat droplets and not infrequently no trace of a cell is left except the nucleus, and the sheath of connective tissue, which formerly enveloped it, is much swollen. The elastic fibers have in most cases disappeared, and the connective tissue between the muscle fibers has become markedly swollen and hyaline and it appears as if it had, by its hypertrophy, impinged upon the muscle fibers and had caused their atrophy. In some of the larger vessels with well developed media, one finds the interesting fact that where the elastica interna has not changed its properties, in other words, where it remains as in the normal quiescent state the muscularis of the media, shows but slight if any change whatsoever. On the other hand, where the elastica has changed so that it has lost its staining properties with Weigert's stain, the media shows all stages of degeneration from that of slight swelling of the connective tissue to that of complete disappearance of all of the muscular elements outside of the elastica interna. The intermediate stages between these two extremes of normal and completely degenerated media can be studied with the greatest ease. If we follow the circumference of the vessel from the normal media toward the degenerated portion of the wall, the first change consists in a marked swelling of the connective tissue in the interstices between the muscle fibers, together with a marked swelling of the circularly disposed, wavy elastic fibers which may assume twice or three times their original size.

A little further on one finds a still more marked hyaline swelling of the fibrous elements and a corresponding atrophy of muscle fiber. Here also one finds that the circularly disposed wavy elastic fibers of the media are undergoing a great change. Each black fiber has grown considerably shorter, but the original length is maintained by a thick heavy red line, which now represents the changed elastic tissue. The red tissue varies in color from a dark port-wine red in the neighborhood of the remaining black fiber to a bright red hyaline tissue in the remoter parts. The dark red tissue is continued along the sides of the fiber where it still maintains its black Weigert's stain.

In a still more degenerated spot in the media all trace of muscularis may have disappeared, leaving only a bright red hyaline tissue, glassy and amorphous, with but an occasional nucleus in its mass. It passes imperceptibly into the already hyaline adventitia externally and is bounded internally by the brick-red modified elastica interna.

To facilitate the description in the subsequent pages I shall apply the term "*atrophic elastica interna*" to the elastica interna when it has lost its property of staining with Weigert's elastic stain and has taken on the property of staining a brick-red, or a bright red or a yellow with Van Gieson.

It will be seen that with the loss of staining properties with Weigert's stain, the elastic tissue irrevocably loses its properties of elastic tissue.

On the other hand, elastica interna that has become swollen to tremendous proportions may pass on to a stage of degeneration as described above or may remain for ever in that hypertrophic state. Such swollen, black elastic tissue I have characterized by the name of "*hypertrophic elastica interna*." Fig. 8 shows these two types very plainly.

It will be noticed that in none of the vessels so far described was there any attempt at renewal of tissue. Let us now pass on to another class of vessel.

ARTERIES THAT HAVE UNDERGONE CHANGE BEFORE LABOR.

Among the vessels of the uterine wall in the direct path of the placental circulation, also among those in the mucosa directly under the placenta, are some which show changes of such a character that the process must have taken days at least for its development.

These vessels, it is true, are relatively few in number, but are often of very large size and therefore must have played no small part in the placental circulation. A close examination of such a vessel shows that the changes already described as affecting the vessels after labor also are present here. But the changes have gone on either to the degree of complete obliteration of the lumen or to a narrowing of its caliber. The atrophic elastica interna is present about nearly all the vessels, but a further step of degeneration has already made itself manifest. Instead of staining a brick-red, one finds it here and there stained yellow with all stages of transition from the one to the other color. In places it has assumed huge proportions, and, as if too long for the vessel which it lines, it is markedly convoluted like the convolutions of the brain. Where so degenerated, its lacunæ, which formerly held muscular elements, are smaller and empty—the muscle fibers have been absorbed. This condition of affairs does not exist equally about the whole contour of the vessel. In other parts it still retains its brick-red color, and the yellow protoplasm and large oval nuclei in its lacunæ show signs of multiplication. Not infrequently two nuclei without division of protoplasm are found. At other times two cells in one lacuna are present—in fact all traces of rapid cell division. Besides these there are numerous embryonic fibrous tissue cells in and within the boundary of the atrophic elastica. The lumen of such a vessel is partially or completely filled by a series of fine laminæ composed of fibrin and small round fibrous tissue cells with an occasional larger truncated nucleus which leaves no doubt but that one is dealing with muscular fibers also. If the vessel is completely closed by a thrombus the organizing process extends to the center, but this is a rather rare condition in the larger branches. If on the other hand the circulation is only partially stopped or slowed by the thrombosis of some of its terminals, the result is somewhat different. In such a case the coagulum or deposit of fibrin seems to begin at a definite point on the vessel wall, and the small laminæ are arranged concentrically about it. At other times the organization involves only the peripheral parts of the vessel between two or more projecting parts as if the stream in these recesses had been slower and deposit or growth more favorable. In such a vessel the invading muscle and fibrous tissue are more evenly divided, but with this difference that the nearer the old elastica interna the more abundant are the fibrous tissue elements whereas the nearer the margin of the new vessel within the old, the more abundant are the muscular fibers.

The latter show a tendency to arrange themselves about the new lumen and to develop a new endothelial lining, though the formation in a vessel so affected is not nearly so perfect as the corresponding changes that take place in similar vessels during the puerperium.

Outside of the atrophic elastica interna the media presents the various stages of degeneration as described above.

The question naturally arises: Does clotting introduce these pre-partum changes, and if so is it a necessary forerunner? That the most advanced stages of narrowing of the lumen are found in the immediate subplacental mucosal area; that the completely obliterated vessels are found chiefly in this region; that the reduction in the size of the lumen grows gradually less and less the farther one recedes from the placental area along the main arterial trunks, all tend to point to the conclusion that there has been obstruction in the placental circulation, that some of the terminals of the greater trunks have become blocked completely by thrombosis and have become completely organized, and as a consequence owing to the smaller demand upon the larger trunk and the slowing of the circulation in it, it tends to reduce its caliber to the demands upon it.

That there is a close connection between these changes and the presence of so-called placental infarcts I have but very little doubt. Their presence in such a specimen as this, in number much greater than in the average parturient uterus, is quite in accord with the multiplicity of placental infarcts found in placentæ of women suffering from renal disease. (It will be remembered that this patient died of eclampsia associated with or caused by a very grave chronic parenchymatous nephritis.)

Moreover, I have found in the extraplacental areas, small submucosal vessels that have undergone the same changes as those described above and in serial sections have found also that they have direct connection (whether as cause or effect I cannot say) with areas of hyaline degeneration in the decidual tissue of the decidue vera and reflexa.

CHANGES IN THE VEINS AFTER LABOR.

Apart from the large veins of the placental area which I have already described, there is throughout the uterus a change which though not marked in the case of most vessels, yet a change that is of the utmost importance in the understanding of the subsequent venous changes.

The veins of the nulliparous uterus as stated above consist of a more or less perfect layer of elastic tissue which corresponds in situation to the elastica externa of an artery and within which the vein wall is made up of a mixture of fibrous, fine elastic and muscular tissues.

The first change noticeable is a remarkable swelling of the connective tissue elements about the vessel, but usually within the elastic capsule. Fig. 3 is a somewhat later stage. This swells to such a degree that the muscular elements which formerly lay in close contact, separated only by a small amount of connective tissue, now become widely separated from one another by the mass of intervening hyaline tissue. The muscle cells can readily be recognized in the pink hyaline mass, which is built up in the wall of the vein and is not as described by others an organization of a clot in the lumen of the vessel. This hyaline swelling often assumes huge dimensions, and its relations to the vessel are very varied indeed. At times only one wall takes on the hyaline swelling, in which case it bulges into the vein as a rounded mass causing the lumen to be in shape that of a new moon; at other times the projection takes place from both sides, and then the lumen is shaped like a dumb-bell. Moreover, several swellings may occur so as to convert the lumen into a star-shaped opening. Or, lastly, the swelling may affect all parts of the wall, in which case the lumen will retain more or less of its normal form. Authors have described these hyaline masses and have found them only in the placental region and have laid great stress upon the fact that their causative agent was of fetal origin, that the syncytial cells invading the walls of the vessels caused coagulation and hyaline organization of the thrombus.

To refute this statement let me add that such changes occur not only throughout the whole uterine body, but occur also in the cervix as I will point out in due time. That the syncytial cells play the important part in their production is, I think, an opinion which has nothing but theory to support it. We are forced to look upon this change as but the most natural means that nature can adopt to reduce the lumina and the raison d'ètre of such hyaline deposits will become evident in the subsequent steps of this work.

What is the true origin of this hyaline mass? Perhaps at this early stage one can study its formation better than in later

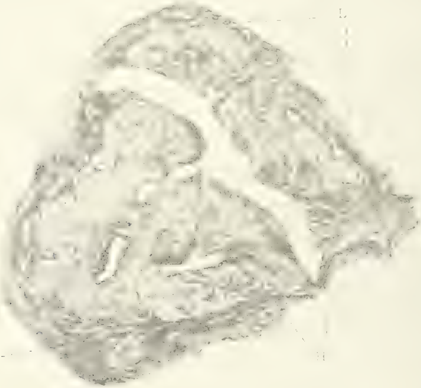

FIG. 3.—Cross-section of a vein whose walls show a marked hyaline swelling of [illegible] more or less [illegible] elastic tissue bands which [illegible] formed the [illegible] of the vein wall. The lighter streaks in the dark [illegible] note the incorp[illegible]

specimens. That they originate in a hyaline swelling of the connective tissue fibrillæ which exists about the vessel there cannot be the slightest doubt. It has been possible to trace them in all stages of their development. But certain factors, which, if left unexplained, might lead to confusion. I refer to the relation of the hyaline masses to the lumen of the vein. Sometimes the hyaline tissue, originating in a small collection of connective tissue in the vein wall affects this collection almost exclusively. If, between this collection of connective tissue and the lumen, a musculo-fibrous venous wall exists, the latter may be hardly affected by the hyaline change, but is simply pushed in toward the lumen to continue to retain its relations with the blood stream. In such cases the hyaline mass lies completely separated from the venous channel by an intact venous wall. But it is not always so. At other times the hyaline swelling of the connective tissue affects the tissue not locally but generally about the lumen, in which case the hyaloid tissue may advance and encroach upon the lumen on all sides, being separated from the blood stream only by the endothelium. In the former type the muscle cells scattered in the hyaline mass are necessarily few owing to their having been few in the connective tissue in which the growth originated, whereas in the second type they are more numerous because the hyaline degeneration has affected the vein wall throughout which is more or less rich in muscle fibers. Clotting as can readily be seen plays no part whatever in such a process, and as will be seen later this hyaline change is but a scaffolding for more highly developed tissues.

Normally the elastic fibers take part with the fibrous tissues in forming the hyaline newgrowth. If the hyaline change should begin in an area made up completely of fibrous tissue, or if the process of change of black elastic tissue into true hyaline tissue is complete, the color of the newgrowth is a clear homogeneous bright red, with yellow muscle cells scattered through it. On the other hand, if the hyaline change begins in an area rich in elastic fiber, the hyaloid tissue stains a deep port-wine red with Van Gieson. The cause of the difference in color is due to fine black particles which exist as dots or as imperfect fibrils in a red matrix.

These are but the remains of the incomplete hyaline change of the elastic tissue. The importance of these remains will appear later.

VEINS THAT WERE AFFECTED PREVIOUS TO DELIVERY.

Two types of changes occur in the veins affected before labor. In the smaller veins of the placental area there is usually a complete obliteration due to the building of a thrombus. This presents characters much like the organization of clots in other regions of the body. But in the larger veins lying deep there is no thrombus formation, but the vessel reduces its caliber just as in the case of the veins described above. Here, owing to the long standing of the newgrowth, changes have taken place, such as the invasion of the hyaline deposit by muscle and elastic elements. But the description of these changes I will reserve for the next case where they may be studied to a greater advantage.

Case II is that of a woman who died suddenly of syphilitic arteritis of the brain five days after a normal delivery. Most of the mucosa, which we described in the placental area as being involved in a coagulation necrosis, has been cast off and a new mucosa has been formed.

What is its origin? There can be but little doubt that it arises from two sources. First, from the fibrous tissue of the underlying muscularis; and, second, from the mucosa of the uterus bordering upon the placental area. My reasons for these conclusions are as follows: A great number of the large vessels filled with clots and surrounded by dying tissue, which were described in the previous specimen as lying well within the mucosa, are seen only in traces on the very surface where they are being cast off, and the vessels which formerly lay deeper have come nearer to the surface. Moreover, in the new mucosa are many strands of muscle fibers which have grown outward in the new mucosa or, what is more likely from their appearance, are disappearing in the rapidly proliferating connective tissue. That the surrounding mucosa must also play a great part is shown by the invasion of the placental area by the glandular tissues. The glandular tissues grow less abundant and penetrate less deeply the farther one recedes from the periphery of the placental area toward the center. In the center of this area especially where the large hyaline bodies, which are the remains of the large placental vessels to be described later, are found, the superficial layers of the mucosa with its columnar surface fail entirely.

The muscle cells throughout the whole uterus are filled with fat droplets. In many cells they lie in parallel lines at the ends of the long nucleus. It is not possible to determine whether there is also a fatty degeneration of connective tissue. One interesting feature is the marked absence of fat about the blood-vessels, both arteries and veins.

But by far the most interesting developments have taken place in and about the vessels. Immediately under the free surface of the mucosa one finds large pale almost cell-free hyaline masses that contrast rather markedly with the surrounding richly cellular mucosal tissue. These masses have a deeply convoluted border externally. They are made up of a moderately wide yellow or brick-red band which follows the convolutions closely and looks not unlike the gray matter of the brain covering the convolution of that organ. This band, as we will see later, is the atrophic elastica interna. It is now almost free from cells, but not infrequently contains numerous vacuoles which denote where the cells previously were. It is very uniform in thickness and sharply defined internally and externally, and forms a complete envelope for the tissue which lies within the lumen which it once limited. Externally, in almost all its circumferences, it lies in direct contact with the mucosal tissue, but here and there a circularly disposed hyaline fibrous tissue—remains of the former media or adventitia– may be found. Within the boundaries of the atrophic elastica externa there is but a hyaline pink stained tissue with but an occasional nucleus. Occasionally a mere trace of blood pigment may occur in the very center, so that the whole structure bears a remarkable close resemblance to the corpus candicantium of an atresic Graafian follicle. Such bodies are large and numerous, and lie frequently in close contact. They present bizarre convoluted shapes, together with signs of mutual compression. Serial sections show that their great number arises from the fact that they belong to the same vessel which in its cork-screw-like course is frequently cut many times in the same plane.

Passing a little more deeply now into the deeper mucosal surface and into the superficial parts of the muscular tissue, one finds that in contrast to the more superficial portions of the mucosa where all the vessels are affected as above described, one finds two types of changes. The one type is similar to that above given where the whole former lumen is filled with a homogeneous hyaline tissue with an occasional nucleus; the other consists of a brick-red wide band as in the previous case, but the lumen is filled now, not with a homogeneous hyaline tissue, but with a newgrowth of hyaline tissue invaded with two classes of cells. The one class consists of small amount of yellow protoplasm with a long parallel-sided, truncated nucleus, which strongly impresses one as belonging to the muscle class; the other consists in longitudinal section of a black spindle nucleus which, when seen in cross-section, presents the appearance of a lymphocyte. The proportion of these types of cells in the various vessels varies within wide limits, now the muscle types are the more numerous, now the fibrous tissue elements predominate.

If one examines a series of vessels so affected, interesting conditions are brought to light. The arrangement of these cells in the newgrowth in the old large lumen is very variable. One may distinguish three types of changes in such vessels at this level in the uterine wall.

These three types are but stages in the development of the same process, yet they throw so much light upon the arterial changes that it will repay to dwell upon them at some length.

In the first type, the lumen of the atrophic vessel is filled with a hyaline tissue almost cell-free, in which toward the center a ring of cells with large nuclei denote the beginning of a new vessel. The new nuclei serve as the endothelial lining to the new lumen. About this primitive vessel lies a wide pad of the newly deposited hyaline tissue, which in its periphery is being invaded by the two types of cells described above.

In the second type the condition of the new endothelial lining is much the same, but the whole hyaline mass outside of it is now infiltrated by loosely deposited muscle and fibrous tissues, which have invaded it. The muscular elements have a strong tendency to multiply more rapidly in the neighborhood of the small new lumen in the center whereas the fibrous tissue elements on the other hand grow more numerous the farther one recedes from this central zone toward the atrophic elastica interna.

The third type shows that the muscular elements have arranged themselves, at first irregularly, later with more order, about the new lumen, and have formed a more or less perfect new media. In cases where the new media is complete its outer margin becomes sharply defined, and if a large space still exists, which in this region invariably does between the outer margin of the new media and the inner margin of the atrophic elastica interna, it shows most interesting developments. For purposes of description I shall apply the term "*interarterial space*" to this area. We will have occasion to refer frequently to this circular band.

This area is destined to supply the adventitia of the new vessel—a statement which will be proved later. The media having been formed and perfected, the superfluous muscle fibers which now lie in this interarterial space undergo a rapid fatty degeneration (Fig. 10). This degeneration has not the characters of the fatty degeneration of the ordinary uterine muscle, but the whole cells become filled and swollen with huge droplets which all show double polarization of rays of light. But the fibrous tissue cells remain and are still recognizable in the hyaline matrix. These will eventually form the fibrous adventitia. In the first stages of development of the new media one finds a rich supply of red hyaline tissue between the muscle fibers, but as the latter multiply the former disappears.

The elastica interna limiting this area which we have just been describing, is generally totally atrophic, constituting an uniformly wide brick-red or yellow band about this zone of great activity.

If now one passes to a deeper area of the uterine wall, one finds matters somewhat different. This difference consists not in the methods involved but differences in results owing to the relative size of the degenerated and newly-formed vessels. We have seen that in those vessels already described the newly-formed vessel is relatively small as compared with the degenerated artery. The reason is that the degenerated artery played an important part in the blood supply to the decidua, whereas the newly-formed vessel has but to supply a small portion of the new mucosa of the nonpregnant uterus.

But necessarily one finds all variations of this relation. The deeper one recedes from the mucosa into the uterine musculature the less marked becomes this difference in size between the containing and the contained arteries. Here one finds a new vessel which just fills the cavity enclosed by the atrophic elastica interna of the old vessel, so that no "interarterial space" filled with hyaline tissue intervenes between them. In another area the new vessel is too large to be contained within the old intima and as a consequence the innermost layers of the old media are retained to complete the outer layers of the media of the new vessel. These two tissues, *i.e.*, the old retained media and the new are separated by the atrophic elastica interna. The old tissue, that is the muscular tissue outside the elastica interna, instead of being yellow is as a rule greenish owing to the rich admixture of swollen black elastic fibers between the yellow muscle cells. The remainder of the media is absorbed and leaves no trace of its former existence and as atrophic elastica is always eventually absorbed, all trace of boundary between new and old media disappears. Given now here a vessel upon which after labor almost the same demands are made as previous to delivery, one finds that such a vessel will have to alter its size but little and one finds also that either the elastica interna becomes atrophic throughout its whole circumference and builds a new elastica a little farther in thereby retaining nearly all the old media to serve again or that the elastica becomes atrophic only on one side of the vessel, allows proliferation of its wall on that side to reduce the lumen. Simultaneous with this unilateral proliferation inward into the lumen there is a corresponding atrophy of the outer portion of the old media in its outer parts.

So one can vary the relations *ad infinitum*, but the process is the same in every case. The only difference between these vessels and those outside the placental area is a difference in size of old and new vessels.

HOW IS THIS INVASION OF THE LUMEN BROUGHT ABOUT?

There are two different methods by which it occurs and these depend upon whether there is a blood coagulum present filling the lumen or whether the lumen still retains its blood current.

In the first case the coagulum fills the vessel, and the elastica interna soon becomes atrophic. Simultaneously with the latter change the fibrous tissue of the media becomes markedly swollen and hyaline. In a very short time a hyaline band is seen to appear within the limits of the elastica interna. This band of glassy hyaline pink tissue, very poor in nuclear elements, rapidly invades the coagulum just as the hyaline fibrous tissue of the corpus luteum invades its blood clot. The end of the process results in the total replacement of the blood clot by a homogeneous tissue, which is then slowly absorbed just as in the case with the core of the corpus luteum. So complete is the absorption that not a trace of this central mass may remain and the lateral walls of the old vessel, composed now only of a tremendously thick yellow or white atrophic elastica interna come together causing a picture which is similar in every respect to the remains of the corpora atresia of the Graafian follicle. I shall have occasion to refer to this in some cases later on. In such a thrombosed vessel the amount of muscle which invades the intraluminar hyaline tissue, which in turn replaced the coagulum is relatively small, is almost nil.

In the case of a large artery which has to reduce its lumen without causing its blood current to cease, the changes are somewhat different. Given the case of a large vessel in which a new small vessel has to be developed, one finds that the first changes are atrophy in the elastica interna, either about the whole circumference or locally, and a marked hyaline swelling of the connective tissue of the media. This red hyaline tissue soon invades the lumen of the vessel and forms a band within the elastica interna at the spot where it is atrophic. If the elastica interna has remained intact in part of its course the hyaline change of the connective tissue of the media does not take place at that spot as already explained, but the hyaline, almost cell-free tissue seems to flow (from its point of invasion, *i.e.*, where the elastica is atrophic) to other parts of the circumference of the vessel finding its way between the normal elastica interna and its endothelium.

Necessarily it remains thickest at, or may be entirely confined to, the spot where it was allowed free ingress between the endothelium and elastica interna. Hence one finds that where the elastica interna has become atrophic in only half of the circumference of the vessel the new lumen may be totally eccentric to the old one and if the hyaline tissue did not penetrate between the unaffected elastica and its lining endothelium, this unaffected elastica may remain to perform the same function for a portion of the new vessel. As to the farther stages but a few words suffice.

Simultaneously with the advance of the hyaline tissue, the muscle fibers of the hyperplastic layer, or those included within the atrophic layer, or those of the first row of the media begin to proliferate and invade the hyaline tissue.

It often happens that the invasion of this hyaline tissue by the cellular elements, both muscular and fibrous, is localized chiefly to one spot of the circumference of the elastica interna instead of occurring diffusely throughout the whole or a large part of this membrane. As a consequence, the muscular fibers are seen at one spot only streaming in over the interarterial space from the old media to reach the new media. Where such occurs the atrophic elastica interna suffers a solution of its continuity and its yellow hyaline structure is much broken up and the fragments are turned at right angles to their former course as if drawn along the stream with the invading muscle. When the invasion occurs locally as above described the "interarterial space" remains free of muscle fibers and relatively free of fibrous tissue except at the spot where the invading muscle and fibrous tissues affected their passage from the old vessel to the new one.

But such is the picture only when a small new vessel grows within a large old one. Given a case of a large vessel being built within a slightly large one, the new media, built up in the same way as above, will impinge upon the old media; and, as described above, call the inner layers of the old media into service to form the outer layer of its own wall. In such a case necessarily there will be no functionless superfluous muscle cells between the two media, but certain of the outer layers of the old media will disappear through atrophy or fatty change. Naturally, under such conditions, there will be no interarterial space found.

Whether the endothelium of the old vessel is always pushed before the hyaline invasion is a question which I cannot answer with any degree of certainty. In some cases it still remains to clothe the advancing growth, but more frequently it is entirely absent. Whether the latter is due to the treatment of the tissues during preparation it is impossible to determine.

A study of the veins of this specimen shows that the development of a hyaline change in the connective tissue of the vein wall as described in the foregoing case has reached a very high grade. The masses are at times huge, scattered throughout the uterus though necessarily most marked in the sub- and periplacental areas or in those parts of the uterus in the immediate line of the blood supply to the placenta. At times had one not studied their origin, one would readily assume that these growths lie within the lumen; at other times a well-formed musculo-fibrous wall has been left between it and the lumen. A noticeable change has taken place. The muscular cells in the midst of these hyaline deposits have undergone rapid growth, so that the hyaline tissue suffers a more or less solution of continuity owing to the yellow streaks running through it (Fig. 5). These muscle cells originate from two sources: from a proliferation of the muscle cells which were originally included within the mass of hyaline tissue and from the muscular tissues in the immediate vicinity which invade the deposit. One other noticeable feature is that the elastic tissue, which originally constituted a sort of capsule of the enlarged vein, has considerably diminished.

Many of the smaller veins, owing to the compression of the uterus and to the growth of the hyaline tissue in their walls have suffered complete obliteration. Doubtless the first agent suffices to obliterate a very large number of them, though one has but theory upon which to base that statement.

Case III is that of a woman of twenty-seven years who died five weeks after delivery owing to a breast abscess which turned into a septicemia a few days before death. The delivery was normal and at no time did the patient show any pelvic trouble. The uterus had undergone some involution, but was still the size of a two and a half months pregnancy. The pelvis was free and the uterine mucosa healthy. The placental site, still readily recognizable, measures 2 1/2 cm. in diameter, and is slightly elevated above the surrounding mucosa. On section the tissue is very soft. Sections were taken as in previous cases from mucosa to peritoneum through the whole placental area and from other parts of the body and cervix. The subplacental area is filled with whitish and yellowish circumscribed patches, which extend a considerable distance into the uterine wall. Examination shows no trace whatsoever of infection of the uterus, so one has to deal with a case of subinvolution secondary to breast abscess. The findings in such a case are most instructive, and the various steps in the involution are more readily followed in such a specimen because they are less rapidly carried out.

The sections through the placental site are strikingly like those of the previous specimen. In fact they had both reached about the same degree of involution, but the former had reached that stage in six days while in this specimen five weeks had been consumed. The convoluted almost cell-free areas in the subplacental mucosa are strikingly like those of the previous specimen except that in many of them the blood clot has not fully been replaced by hyaline tissue. Deeper in the wall of the uterus the most striking differences occur between this specimen and the previous one —differences which are more pronounced in some of the cases that follow, but can be studied to great advantage in the present one. The brick-red atrophic elastica interna retains much the same characters as in the foregoing specimens. The atrophic elastica in the case of some vessels has assumed gigantic proportions by a process of swelling which seems but a preparation for absorption (Fig. 4). The most of the vessels show that the elastica has not suffered this atrophic change throughout the whole circumference of the vessel (Fig. 9). In fact in some of its course it is but slightly swollen (Fig. 4). At the ends of such an unaffected portion the fibers, still retaining their staining power with Weigert's stain, swell tremendously and a little further pass slowly or abruptly over into a wide port-wine-colored area, which in turn passes almost insensibly into the brick-red color, then yellow and lastly it remains almost colorless. These various transitions or degrees of change can be readily followed as one traces the elastica interna in its continuity about the vessel. It is not uncommon to find areas at the outer margin

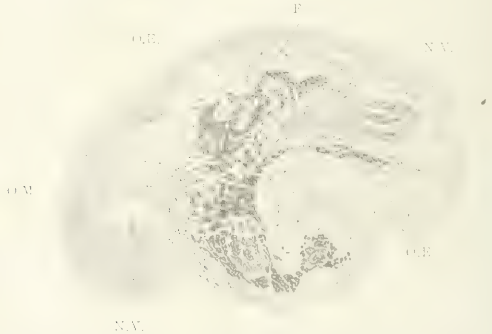

FIG. 4.—Vessel of subplacental area cut somewhat diagonally. *n. v.* denotes the new vessels within the old one. There are not two vessels but the same vessel is cut twice. The old elastica interna, *o. e.*, can be traced completely about the vessel. Where not so swollen and degenerated the old media, *o. m.*, remains in a more or less good state of preservation though completely disappeared in other parts.

The now superfluous muscle cells in the "interarterial space" have undergone fatty degeneration, *f.* This fat causes double polarization of a ray of light.

of the thick yellow or colorless atrophic elastica, in which a small portion of the elastica interna stains black. When such is the case a relatively wide area of deep red immediately bounds this spot on all sides and the red color then slowly diffuses itself out into the surrounding yellow elastica until growing paler and paler all trace of red color is lost. In such a specimen the transition from true elastica interna through its degenerative stages can be traced with the greatest ease.

Where the elastica interna has retained its normal staining properties and dimensions for any considerable fraction of the wall of the vessel the media which lies to its outer side remains almost without the slightest change (Figs. 4 and 7). If such is the case on one side of the vessel, it is usual to find the opposite half completely changed (Fig. 4). Here the elastica is completely atrophic, the muscularis of the media has completely disappeared, and the partially absorbed hyaline adventitia now lies in contact with the yellow elastica interna (Fig. 4). If one now traces the media from the normal side of the vessel to the atrophic side, one can study the stages of its degeneration and absorption with great ease. This consists as explained above in the following: Where the elastica interna becomes somewhat swollen the connective tissues lying between the muscle fibers of the media show the same change. Where the elastica interna begins to turn to red the elastica tissue of the media undergoes the same change and the fibrous tissue becomes markedly hyaline and swollen, and the muscle fibers in this hyaline meshwork seem compressed and atrophic. Then absorption of muscle fibers and hyaline tissue takes place until all trace of media is lost. The adventitia undergoes the same changes but somewhat later than the corresponding tissue of the media.

While these changes have been going on in the walls of the old vessel, changes similar to those described in the previous case are taking place in the lumen. But instead of a single vessel being constructed within the old one, as in the foregoing case, there is a series of vessels each smaller than the next, all concentrically arranged and all more or less perfectly differentiated into elastica interna and media. The process by which these have been brought about is similar in every detail to that described where a single vessel is formed in the lumen of the old one. A ready explanation for the repetition of the process is found in the fact that in this case five weeks had elapsed since delivery; that the puerperium was not a smooth uneventful one; that metabolism was not always evenly balanced, *i.e.*, that anabolism was at time in the ascendant, katabolism at other times; that during the periods during which the breast trouble called nearly all the vitality of the patient into play, the uterine contractions and retractions ceased and during this period of relative uterine quiescence the new tissue already formed differentiated itself into layers to form a vessel adequate for the demands of the still enlarged uterus. Here in a subsequent period of improvement in the general health of the patient, anabolic changes again are active, uterine contractions and retraction set in, the volume of the uterus diminished and the vessels must also reduce their caliber. Hence a call is sent to the first newly-formed vessel to invade its own lumen and build a new wall within its own, just as had been done by the old one previously. These phases of katabolism and anabolism may alternate many times. Some of these arteries show five such vessels one within another. This gives one a fair idea of the tremendous rapidity of tissue change and differentiation. But the periods of plus and minus uterine activity must not alternate too rapidly, otherwise the newly-formed tissues will not have sufficient time to form walls that are at all perfect. In the uterus of five days postpartum, already the differentiation of tissue in the walls of the new vessel was fairly complete. Hence we can understand with such rapidity of growth and differentiation how it is possible for so many new vessels to have formed in a period of five weeks.

Moreover, but the merest traces of the parent wall frequently remain and just as the parent vessel has degenerated, so do the outermost newly-formed vessels show traces of degeneration. In other words, the process in the normal rapid involution is such that tissues have not time to crystallize until the complete involution has taken place. But in diseased conditions the uterus remains quiescent for certain periods, during which fixation and order in tissue can take place. It is like a series of normal involutions. Now these vessels present also other very interesting features which are of great service in explaining the origin of the marked differences between the so-called typical parous and the nulliparous uterus.

About many of the arteries in the inner third of the uterine musculature, the elastica interna instead of being atrophic has become markedly hypertrophic so that the once delicate elastica has now swollen to huge proportions, and stains an intense black with dark red borders. In such cases, as above stated, the elastic tissue of the media becomes also much swollen and lies in a matrix of deep red hyaline tissue. The proportion of this hypertrophic elastica interna and hypertrophic elastic tissue of the media to the rest of the vessel where it has either become atrophic or has totally disappeared, is very variable. At times it is hypertrophic throughout the whole circumference of the vessel under which circumstances the new vessel in the interior is usually very rich in elastic fibers and relatively poor in muscle, and the more completely atrophic the elastica throughout the circumference of the vessel the more perfect and the freer from elastic tissue is the musculature of the new vessel in the center (Fig. 7). Now, if one varies the amounts of atrophic and hypertrophic elastic tissue in the old vessel wall one can readily see that there will be new vessels completely free of black elastic tissue in their immediate neighborhood, others again will be surrounded more or less completely by a wide pad of black elastic tissue and that others will be completely encircled by this unabsorbed modified wall (compare Fig. 7). Not infrequently also if the old vessel is large and the new one within it is small, the latter may assume such a tortuous course that its lumen is frequently cut in two places (Figs. 4 and 6), so that one gets the impression of two new vessels within a single unabsorbed old wall made up almost entirely of elastic tissue.

This is exactly what is found in the case described as typical of a parous uterus.

In the case of some arteries the reduction in size which the old vessel has to undergo is very small indeed, consisting simply in

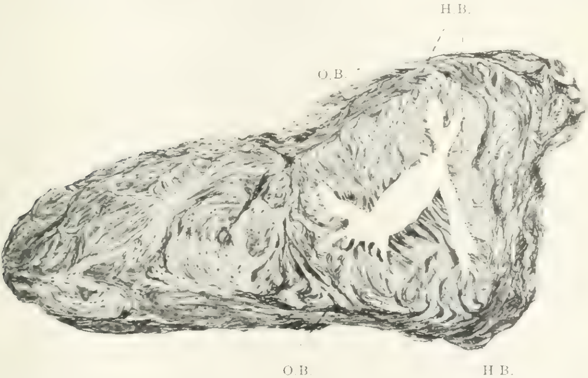

FIG. 5.—Vein showing a later stage than that of Fig. 3. The muscle tissue has greatly multiplied and replaced a great deal of the (*h. b.*) hyaline tissue. *o. b.* denotes the old elastic boundary of the formerly large vessel. The vessel is cut somewhat diagonally so that the left portion of the drawing cuts the new wall of the vessel without touching the lumen. Note here the same hyaline substance with muscle fibers.

the building, as it were, of a new "hyperplastic intimal layer." It may be laid down, as a rule not without exceptions, that the greater the amount of reduction necessary the more perfectly is it generally done. Owing also in this specimen to the relatively slow absorption of waste products, the atrophied tissues of the parent vessel remain a very long time unabsorbed so that their relations to the new vessel can be studied with great ease in the large trunks of the middle third of the uterine wall. Throughout the uterus, except those arteries which supply the placenta, the atrophic elastica interna is seen to lie within the media of the new vessels. At times it lies close to the new lumen, with only a thin layer of muscle separating it from the new elastica interna; at other times it lies far out in the media near the outer margin of the middle wall of the artery. In the former case the artery had to reduce its size but slightly and nearly all the old media is retained, while in the latter the reduction in size is great and the new artery has almost a completely new media, but a small ring of the inner portion of the old wall may

M. [illegible]

FIG. [illegible].—A [illegible] inner third of uterine wall. It is cut [illegible] The elastica interna is now hypertrophic, now atrophic, *i.e.*, now black, now yellow. *n. m.* [illegible] lumen. *m.* The old media has disappeared almost completely except where the elastica interna has retained its black stain. The interarterial space contains relatively few cells in a hyaline matrix.

be retained to complete the necessary arterial thickness. The outer portions of the old media, being now superfluous are slowly absorbed by a primary swelling of the connective tissues, loss of staining properties of its elastic fibers and fatty degeneration of the muscle cells and subsequent absorption of the hyaline, swollen connective tissue. But, unfortunately, the steps are not always so complete. Instead the elastic elements swell, parts of them stain a dark red, others black; the muscle cells disappear and the swollen elastic tissue instead of undergoing further destruction remains to increase the perivascular elastic tissue of the quiescent parous uterus.

The exceptions to this general statement given above—that the atrophic elastica interna is seen to lie within the media of the new vessels—arise in the vessels of the placental area and

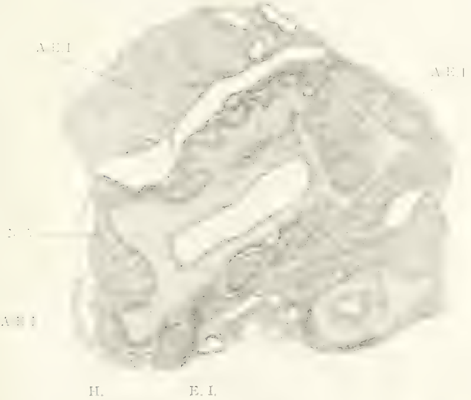

Fig. 9.—Section of vessel containing a new smaller one. The elastica interna, *a. e. i.*, has become atrophic in all its course except at one spot, *e. i.*, where it retains its black stain and where the muscularis of the old media remains though disseminated with elastic tissue. *h.* denotes the interarterial space filled with a hyaline substance. At one spot it has become invaded by elastic tissue. *n. v.* The new vessel within the old.

In the upper left corner is shown a large corrugated atrophic elastica interna of a vessel cut more or less parallel with its long axis. It contains in its central part a minimum of red hyaline tissue.

In the right lower corner one sees a partially atrophic old vessel of small caliber with a still smaller new vessel in its lumen and a relatively large interarterial space filled with red hyaline tissue.

subplacental areas and lateral walls of the uterus; in short, in all those areas which lie in the direct line of the placental circulation. In such vessels the demand made upon them postpartum is so small as compared with the demand during pregnancy, that the reduction in size is enormous. As a consequence the new vessel and its walls not only lie within the lumen of the old one, but not infrequently the interarterial space is very large and is filled with a hyaline tissue which is partly converted into adventitia and partly slowly absorbed as the old vessel contracts about the walls of the new (Fig. 9).

From the study of such an uterus one is astonished to find that all the vessels, even those of the subperitoneal region as well as those of the decidua vera, undergo this change of size, and the process is the same throughout whether one has to deal with vessels that supplied the placenta or not and the minor differences that are present are differences due to relative size of old and new vessels.

The Uterine Veins.—The veins have reduced their lumen by the process which was outlined in the previous specimen. The large hyaline masses which have been described in the walls of the veins in the previous specimen have undergone slight changes in the uterus—changes which give one a clue to the origin of the vast differences which exist between parous uteri in the period of quiet. We find that the masses of hyaline tissue have undergone one of two changes, either the growth of muscle fibers previously in the mass, or of those in the circumference, has greatly segmented the hyaline tissue and replaced it (Fig. 5); or a thing that is also not uncommon, the hyaline mass is gradually invaded or replaced by elastic tissue (Fig. 10). That the former, *i.e.*, the replacement by muscular tissue, is the normal way is shown by an examination of the veins of young parous women who have undergone a normal and rapid puerperium. In such a case the projections into the vein lumen, which I look upon as one of the chief characteristics of a parous uterus, are almost entirely made up of a muscular tissue with a minimum of fine elastic and fibrous fibrils.

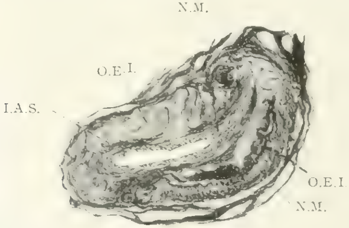

FIG. 8.—Slanting section of a vessel showing yellow atrophic elastica interna, *o. e. i.*, on the upper side with complete disappearance of the old media that bounded it externally, whereas on the opposite side the elastica interna has become swollen, *o. e. i.*, and the media, *m.*, remains though thickly invaded by elastic tissue. *n. m.* The new media surrounding the small lumen. *i. a. s.* Interarterial space much invaded by elastic tissue.

Given a case where the more highly specialized tissues are not capable of being rapidly reproduced, and the processes of destruction and absorption are below par, the tissues which in normal cases are absorbed and replaced by muscle become now hypertrophic and fill the spaces where muscle should invade.

So it is that the muscle fibers in such cases are sparsely scattered in the hyaline mass, and instead a lower grade of tissue, elastic tissue, acts as substitute—a lower grade of tissue, it is true, but a higher grade than fibrous tissue, for though it cannot contract like muscle yet it possesses a virtue almost unknown to fibrous tissue—that of elasticity, which makes it a better substitute for muscle than the inelastic adult fibrous fibrillæ.

But given a large vein in the deeper layers of the uterine wall—a vein which lies in the direct course of the placental circulation, its function is greatly reduced postpartum and its caliber must be correspondingly reduced. In such a vessel the new lumen is minute as compared with the old one. Hence the pads of hyaline tissue are often huge. The approximate outline of the old vessel can be readily made out by the thick band of elastic tissue which originally surrounded the old vessel at a very short distance from its lumen (Fig. 5). An examination of such a vessel reveals the striking fact that the hyaline masses are gradually replaced by muscle tissue with more or less abundant elastic trabeculæ. When the replacement by muscle is complete the outer layers of muscular tissue gradually arrange themselves into bundles and become no small factor in making up the new musculature of the uterine body, whereas those lying close in upon the lumen of the vein differentiate themselves into a more or less perfect wall to that vessel (Fig. 5). The variability of

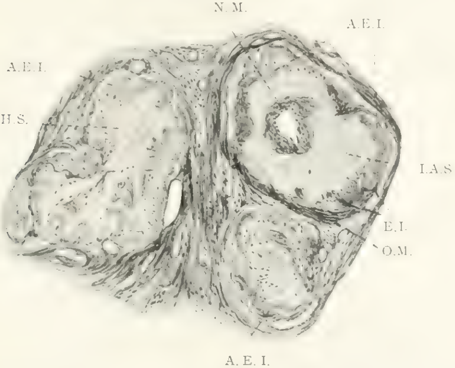

Fig. 9.—Three vessels from the remote subplacental area. Two have not developed a new vessel in the interior of the old one, but the third has done so. *a. e. i.* Atrophic elastica interna which can be followed completely about the vessel. *e. i.* Hypertrophic elastica interna with remains of the old media, *o. m.*, lying to its exterior. *i. a. s.* Interarterial space filled with a hyaline almost nuclear-free substance. *h. s.* The same hyaline substance, filling the whole lumen of the old vessel.

muscle and elastic tissue in this replacement process of the hyaline mass can be very great. About some of these large veins the muscle bundles are relatively free from elastic tissue, not only between the muscle fibrils but also in the interfascicular trabeculæ. In others, on the other hand, it is very abundant so much so that each muscle fiber, separated widely from its neighbor, is surrounded by a mass of elastic tissue. In still others the muscular elements are almost absent and the replacement has been almost entirely carried out by the elastic tissue.

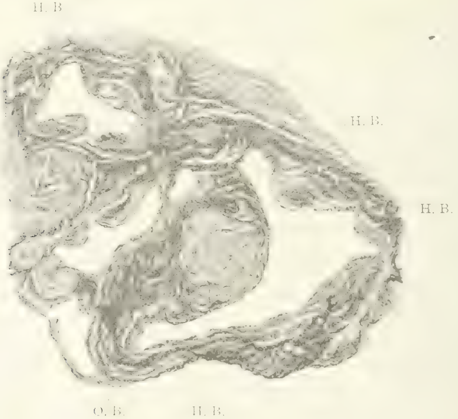

FIG. 10.—Section of veins in which, owing to chronic tuberculosis, the hyaline bodies, *h. b.*, in the walls are being replaced by elastic tissue instead of by muscle. *o. b.* denotes the boundary of the old vessel.

CASE IV is that of a woman twenty-one years of age, who died of tuberculosis of the lungs two months after delivery. She had never been robust, had had a slight cough for years, but had enjoyed fair health until two weeks before death when she suddenly developed high fever, sweats, and died with all the signs of acute pneumonic phthisis. Her pregnancy and labor as well as the puerperium were otherwise uneventful. The uterus was well involuted, even to a state of hyperinvolution. The placental site was about 1 cm. in diameter and slightly elevated above the general surface. The uterine mucosa was healthy in every respect. Sections through the placental site show that it is covered by a mucosa which in the center is devoid of glands, but is here made up of a very vascular fibrous tissue in which large connective tissue cells are seen filled with blood pigment.

The most striking feature of the subplacental area of the mucosa consists in the already described large, convoluted, homogeneous, highly refractile, unstained areas which are but the remains of the enormously swollen elastica interna of the atrophic vessels. These hyaline areas are at times very large and are the first objects that meet the eye as one glances at such a specimen.

But in this uterus the process of absorption has gone on to a much more advanced stage—not that the atrophic elastica interna has been absorbed, but the hyaline newgrowth which filled the lumen and replaced the coagulum has been almost completely absorbed. Its cellular elements have previously undergone a fatty degeneration. What must result is evident and is as follows: As the hyaline newgrowth is absorbed, the thick inelastic yellow atrophic elastica interna must, owing to the compression of surrounding tissue, increase its folds and

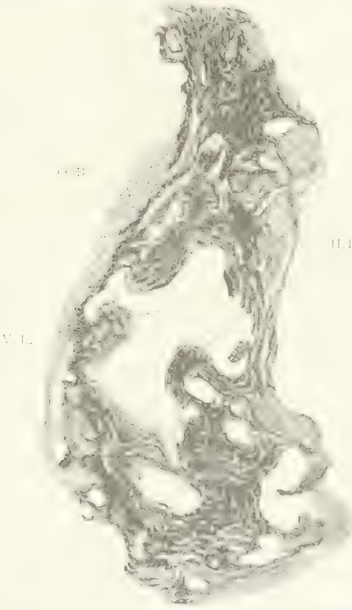

FIG. 11.—Another vein in which, owing to chronic nephritis, the whole of the hyaline deposits, *h. h.*, have been replaced by elastic tissue. *o. b.* old outer boundary of vein.

become quite crimped upon itself until finally, by a complete absorption of the hyaline tissue, the opposite walls of the thick elastica interna come to lie in contact with one another. The method of folding of the layer is rather uniform though many exceptions occur. I cannot compare it more aptly than to the closing up of an accordion (Figs. 6 and 9). At a certain state of the retrogressive changes a minimum of fibrous tissue—all that remains of the hyaline growth—lies between the pleats and folds so that its resemblance to the last stages of a convoluted, twisted corpus luteum is the closest possible, except that with Van Gieson the former remain yellow or colorless, whereas that of the ovary stains red.

Leopold, having found these "hyaline masses" in the uterus of puerperal women, mistook them for the remains of organized clots. It is easy to see that such is not the case. The remains of the organized clots are few if at all present. They consist in the hyaline tissue which at first replaces the clot just as is found in the center of a corpus luteum. Later this hyaline tissue disappears completely, leaving only an occasional connective-tissue cell between the folds of the atrophic elastica. Still later even this last trace of the coagulum may disappear. So it is that here again a resemblance to the changes in the ovary is as close throughout as it is possible to imagine.

Such a description as that given above applies to the last stages of the old placental vessels as seen now in the superficial layers of the mucosa. Deeper down in the new endometrium, the old lumen builds not only the hyaline tissue as described in the previous type, but allows invasion of its lumen by muscular and cellular elements and subsequent formation of a new vessel. From this it will be seen that not all arteries which supply the placenta build a new vessel within their lumen. Many atrophy and disappear completely—compare the two types in Fig. 9. But the "interarterial spaces" undergo the fatty change as described in the previous uterus, and by the gradual absorption of these tissues the, at first more or less wide interarterial space, reduces itself to a mere fissure containing a minimum of fibrous tissue which passes into the convolutions of the shrinking folded atrophic elastica interna which now comes to lie with its folds close upon the thin adventitia of the new vessel. Such is the picture and the process in a large vessel whose elastica is completely atrophic. The new vessel within its lumen is free from elastic fibers. But the picture is so different in other cases where the elastica instead of becoming atrophic, becomes hypertrophic, that the end-products have not the slightest resemblance.

An examination of such another large vessel at about the same depth in the uterine wall shows that instead of the whole elastica interna and the media becoming atrophic, or disappearing, respectively, as in the previous type, only portions become atrophic while the others remain either nearly normal or markedly changed.

As pointed out in previous cases where the elastica interna remains normal, its media at that spot remains without marked change (Fig. 4). It is therefore not uncommon to find a small new vessel with its three coats surrounded for two-thirds of its circumference by a thick yellow folded atrophic elastica and a thin ring of red hyaline tissue—the remains of the old media and adventitia—whereas the other third is surrounded by a more or less normal parent arterial wall with its three coats, but naturally no endothelium is present.

The condition of the portion of wall of the parent artery, which remains, may, as in the vessel just described, be almost normal, but in the great majority of cases it has also suffered considerable change. For example, it is rare to find that a portion of the media and elastica interna remain more or less normal when another portion is completely atrophic. It is contrary to the nature of things to expect such. Why a portion of a wall should remain unabsorbed, even though profoundly modified while the rest is absorbed, is equally difficult of explanation. But lack of compression at that spot, probably better blood supply, probably less lymphatic obstruction may be offered as possible factors. Be that as it may, in this specimen it is a rarity to find a new vessel about which the walls of the old vessel have been completely absorbed. A portion of it always remains though being more or less changed, owing to the great storm of tissue change that has taken place about it and in it.

The commonest type of remnant is about as follows. A portion of the elastica interna has become swollen and hyaline, stains yellow or brick-red in color. The media has completely disappeared outside of such an area or is represented only by a thin band of hyaline tissue which has remained unabsorbed. At the opposite side of the vessel the elastica interna has swollen until it equals in the thickness that of the atrophic portion; the elastic tissue of the media is tremendously swollen also. The fibrous tissue of such a spot has already become hyaline and been absorbed, but about the margins of the stout elastic fibers of the media as well as on both sides of the swollen elastica interna a thin zone of dark red modified elastic tissue is almost invariably present. The muscle fibers are usually much reduced in number in such tissue and may be fairly healthy-looking or very atrophic, depending upon or merely coincident with a slight or marked hypertrophy of the elastic fibers respectively. The adventitia in such an area has lost its fibrous tissue and its elastic fibers have also become markedly hypertrophic. If we follow the course of the media we find in a specimen of this age that the transitions from this hypertrophic tissue of the media to the other part of the media which has disappeared completely is, as a rule, not through the port-wine color to the bright red. The boundary line between hypertrophic and yellow atrophic elastic tissue is abrupt, and what now remains as black hypertrophic elastic tissue will likely remain in the uterus until disturbed by a new pregnancy. Whereas the elastic tissue which has gone on to the red color has irrevocably lost its properties of elastic tissue and will eventually be absorbed. The same is true of the elastica interna. In previous specimens which were in an earlier stage of involution—in fact, specimens which were undergoing rapid changes—the elastica interna passed through the stages of dark red, brick-red, yellow, and colorless hyaline change, but now in this specimen the hypertrophic black elastica ends abruptly and the yellow begins equally abruptly where the other left off. In other words, the boundary between dead and living tissue has been sharply drawn.

To state, however, that, where a new vessel is surrounded by the remnants of the parent vessel, the three coats of the latter are always recognizable, would be to convey a very wrong impression. In not a few the media and adventitia have been absorbed, and nothing but a markedly hypertrophic elastica interna remains enveloping the young vessel. In other cases only a small portion of the thickness of the parent media lies in contact with the elastica. But from an examination of many specimens it is strongly impressed upon one that of the tissues which constitute the wall of an artery, the elastica interna is the most resistant and the muscular tissue the least and the fibrous and ordinary elastic tissue are intermediate. It seems that a change of blood supply, a variability of compression, possibly a complex combination of causes, may operate in causing slow death of all the tissues. But, on the other hand, a stimulus which may be sufficiently powerful to destroy muscle tissue may be just sufficiently stimulating to cause elastic and elastica interna to multiply; and, again, that which may cause change and absorption of the ordinary elastic tissue may also be sufficient to cause the elastica interna to hypertrophy. True it is that remnants of media are never found without its elastica interna being present in a more or less perfect condition, and a moderately well preserved media is never present where the elastica interna has become atrophic. Hence, in the great majority of cases without any chronic disease, the only part of the parent vessel which remains unabsorbed but highly hypertrophied is the elastica interna. This finding coincides with those in quiescent parous uteri. Here in the majority of cases the elastic pad about the vessel is a uniform band which envelops more or less or perhaps the whole of the contained vessel. Not infrequently years after labor the elastic pad presents the convolution such as already described in the foregoing pages as occurring in the modified elastic tissue (Figs. 6 and 8). This, as was stated in the first pages of this work, is usually sharply defined internally and externally, and may be separated from the outer margin of the new media by a thin layer of fibrous tissue (Fig. 8) or the pad may lie directly upon the media.

How can we account for this difference of disposition of layers?

Why should fibrous tissue intervene between the two vessels at one time and not at another?

A close examination of the specimen of this and the next two uteri allow of a ready answer to this question. We have seen when a vessel is built up within the lumen of a parent vessel, the lumen may be either too large to be filled by the smaller vessel or too small to accommodate the offspring. If the parent vessel is too small then, as pointed out before, part of the media of the parent vessel will serve as media to the new one. Hence no space will intervene between the two. But if all the media of the parent vessel is not required, the surplus atrophies, and in that atrophy of the muscle the elastic tissue about the muscle fibers may become markedly hypertrophic and remain unabsorbed, in which case it will lie directly upon the media without intervening fibrous tissue. But, though it does occur, it does so only in the deeper portions of the uterine wall where the vessels have not to reduce their size so markedly.

But the chief seat of such characteristic extravascular elastica pads in the parous uterus is, as above stated, in the inner third of the uterine wall. How can one explain the presence or the absence of the fibrous tissue between the parent and young vessel in this zone?

We have seen that in the vessels below and for a wide space on either side of the placental site there occurred between the very large atrophied parent vessel and the outer margin of the new one a wide space—the "interarterial space" (Figs. 6, 7 and 9)—in which the superfluous muscle cells underwent fatty change (Fig. 6) and complete absorption after the new media has been formed and its outer margin has been sharply defined. We saw also that the remaining hyaline tissue and fibrous tissue became differentiated into a new adventitia by the absorption of the hyaline substance, and that with its absorption the atrophic elastica interna became folded owing to pressure from without. Such is the origin of the small amount of fibrous tissue between the remnant of old elastica interna and the new vessel. But, as seen in this uterus in a large number of vessels, the hyaline and fibrous tissue of the interarterial space, when delay in absorption takes place, become invaded by fine fibrils from the hypertrophic elastica interna which bounds the interarterial space externally (Fig. 8). This invading elastic tissue becomes quite dense; and, being continuous with the hypertrophic elastica that gave it birth, it becomes indistinguishable from it and therefore the mass of elastica becomes to lie directly upon the new media and not infrequently invades it too, though less markedly.

So it is seen that the pads of elastic tissue about the vessels of uteri of parous women are mostly derived from the elastica interna of the parent vessel which may or may not be supplemented by either the hypertrophic elastic tissue of the media and adventitia, or by the replacement elastic tissue found in the interarterial space, or by a combination of tissues from all of these sources.

The Involution of the Veins of Case IV.—It is surprising what a difference can exist in the end-products of the changes about the venous system. This case, owing to causes which I will define later, has a marked tendency to fill up with elastic tissue the spaces which should normally be filled with muscle. I will have occasion later to point out that all chronic diseases which sap the vitality of the patient have the tendency to substitute elastic tissue where normally a more highly specialized tissue is called for. In this case the hyaline deposits in the walls of the veins have, in a great majority of cases, remained a dark red color instead of being of a bright light red (Fig. 10). An examination of such a deposit shows that the darkness of the red is due to the presence of fine particles and fine fibrils of elastic tissue which still retain a black Weigert stain in the matrix or red.

Seemingly in many of these hyaline deposits in the venous walls many of the elastic fibrils have not completely lost their properties, that is, have not been sufficiently changed to make them lose their properties once and for all. Such fibers which have not completely lost their staining properties with Weigert, again assume their former characters when regeneration begins. The bearing of this will be shown in the following paragraphs. Other hyaline deposits are quite free of black particles in the hyaline meshes and are in consequence of a bright red color. Such a deposit, derived both from elastic and fibrous tissue, seems to have lost all its properties of tissue and remains as an inert mass. In normal cases, muscle cells, derived either from the muscle fibers incorporated in the deposit, and those derived from the surrounding muscle bundles, invade and replace the hyaline tissue (Fig. 5). But in this case—and it will be shown what causes can bring this about—many of the bright-red hyaline deposits still present a central core of hyaline bright-red tissue free from elastic fibrils while the borders of the deposit have been invaded by a thick mass of elastic tissue, which will gradually advance into the very center and totally replace the hyaline tissue. In other cases where the retrogressive changes throughout the hyaline mass has not been complete enough to irrevocably destroy the elastic tissue—*i.e.*, those masses that are of a deep port-wine red color—show the same invasion of the mass at the borders as in the previous specimens, but in addition the undestroyed elastic tissue in the center of the deposit has also begun to regenerate, though more slowly than the elastic tissue at the margin (Fig. 10). In other veins again the substitution of the hyaline deposits has become complete and has been carried out entirely by the elastic tissue, there being almost a total absence of muscle cells (Fig. 11). So it is not common to find the walls of many veins, and all the space, which lies between the limits of the old and the new vessel, filled with almost a solid mass of elastic tissue where normally muscle bundles, surrounded by a minimum of elastic and fibrous tissue, should be seen.

As a consequence of the improper replacement, and also possibly by the subsequent contraction of the elastic tissue, the projections into the veins grow small and the lumen remains inordinately large.

Case V is that of a woman of thirty-five who died of tuberculosis of the lungs ten weeks postpartum. She had suffered from the pulmonary affection for many years, and she was very weak and coughed a great deal during the whole of her pregnancy. She grew worse during the last months of her pregnancy. She was delivered of a full-term child, after an easy labor; ten days afterward she developed profuse night sweats, her cough grew worse, and she died of a severe hemoptysis exactly ten weeks after delivery. The uterus was large and presented all the appearances of a menstruating organ. The placental site is still readily seen, and is about .75 cm. in diameter. On section the wall is soft, and large white areas are disseminated throughout the inner and middle third of the wall below the placental site. The sections of the mucosa of the placental site are exactly like those of the former section, only that the atrophic elastica interna of the convoluted pale areas is still thicker than in the previous specimen and instead of the hyaline core the obliterated lumen contains in its center blood pigment and large quantities of fat. From the foregoing it can be gathered that the processes of repair and degeneration have not gone as far as in the uterus of the previous case. There is much blood pigment throughout the uterine wall, and the amount of elastic tissue about the vessels is astounding. Throughout the uterus it is a rare thing to find the remains of the parent vessel totally absorbed; on the contrary, less of the elastica interna has become atrophic and more of it hypertrophic, and everywhere are seen thick pads of elastic tissue where formerly the muscular media existed. Moreover, in many of the vessels the hypertrophic elastica interna has invaded the "interarterial hyaline space" and converted it into a large mass of elastic tissue, which lies directly upon the media, and in many of the vessels the new media itself has suffered a great deal by this encroachment, so that its individual muscular fibers are surrounded by a thick meshwork of elastic fibers. Such is the condition found in the placental site where a small vessel lies within a large parent vessel. But in other parts of the uterus the same strong tendency for the elastic tissue to hypertrophy instead of degenerating and for the old muscularis to be incompletely destroyed or for the new media to be poorly constructed, and the same lack of absorption of atrophic tissues makes itself manifest. Hence it presents exceptional opportunities for drawing the line between old and new tissues in the arterial walls. If we take as an example a vessel which has to reduce its caliber but a little, we find that the elastica interna has hypertrophied tremendously, has grown chiefly into the lumen, as would the hyaline tissue have done under normal circumstances, and there it has differentiated itself into a more or less perfect (usually very inperfect) elastica interna, and the tissue between it and its parent is filled in with coarse fibrous tissue in which an occasional muscle cell is found.

During this change the elastica of the media has also become tremendously swollen so that the muscle fibers lie in a thick meshwork of elastica tissue and the elastica of the adventitia has also under the action of the same stimulus become much increased. So, if we vary the size of the parent and new vessel, we find that the nonabsorbed, nonatrophic but hypertrophic elastica interna lies now close to the new lumen, now remote from it and the thin or thick new media, respectively, is more or less markedly invaded by elastica, while the outer layers of the media of the old wall, which should have disappeared completely, have been converted into a thick mass of elastic tissue which goes to swell the amount of that tissue about such a vessel.

As for the veins, it is a rarity to find a hyaline deposit that has been replaced by muscle fibers. On the contrary, the whole deposit has been replaced by elastic tissue, and even the fine fibrils in the walls of the veins, outside of the deposits, have taken on tremendous hypertrophy where only muscle with a small amount of the connective tissues should be found.

Case VI is one of exceptional interest in that ten months had elapsed since her confinement, which consideration, taken in conjunction with the findings, will enable one to draw conclusions of great clinical interest.

The patient had been delivered ten months before death of a healthy child. She had been quite well during her pregnancy and also during the first ten months after her delivery. She nursed her baby until just before entering the hospital, *i.e.*, roughly ten months. She suddenly took sick with vomiting, which became so severe that she could retain no food whatsoever. She consulted a physician, was given a remedy, and shortly afterward developed a severe jaundice. Five days after the onset of her illness she was brought to the hospital. The jaundice was very marked, and in twenty-four hours she became delirious, temperature rose, and she died four days after being admitted. In all, nine days had relapsed since the onset of symptoms.

Anatomical diagnosis was: acute yellow atrophy of the liver, chronic parenchymatous nephritis, bronchophthisis incipiens.

The case shows that at this remote date, namely ten months and nine days after delivery, the uterus still is considerable larger than the quiescent parous organ, that it is softer than normal, that she was menstruating at the time of death, and that the organ owing to its very slow involution and to the poor reparative powers of the patient, has retained not only a great amount of tissue that is functionless, but also a great deal that should have been rendered capable of absorption.

Sections of such an uterus slow what a striking resemblance there is with those of the two previous cases. There are still in the mucosa the large hyaline convoluted patches--remnants of the elastica interna which should long have been absorbed. Deeper in the uterine wall one finds relatively normal new vessels. Practically none are free from the remains of the parent vessel and most of them are surrounded by a mass of elastic tissue which shows that not only the elastica interna has become hypertrophic, but that in nearly every case the elastic tissue of the media has completely or partially choked out the muscle cells; that the elastic tissue of the adventitia has greatly hypertrophied and that the interarterial space has become invaded and filled with elastic tissue. A feature which is very marked in the case, but can also be seen in the foregoing, is as follows: In a vessel in which one-half the elastica interna has become atrophic and yellow, and in which its media at that spot as usual has completely disappeared while the other half of the vessel is markedly hypertrophic and black, we find that the "interarterial space" becomes filled with elastic tissue on the side where the elastica interna has been preserved and is hypertrophic, but on the opposite side, where the elastica interna is atrophic, the hyaline tissue of this same space retains its characters of fibrous tissue and forms a normal adventitia. This proves a statement given in previous pages that elastica interna, when it has passed through its dark red stage, has irrevocably lost its power to reproduce its kind. In other words, it is dead tissue and may remain unabsorbed for months (ten months in this case) after its formation.

The walls of all the arteries are thickly beset with elastic tissue, showing that here also hypertrophy instead of atrophy of elastic tissue has taken place. It is a striking fact that wherever such an hypertrophic effect is produced upon the elastic tissue of the arteries, be it ever so slight, a corresponding hypertrophy of that tissue is also found throughout the uterine wall. This argues strongly for a general and not a local cause, and I will have occasion to revert to this question shortly.

Another interesting fact is found in the relations which the atrophic and hypertrophic tissue bear to one another. We have seen that in cross-sections of many vessels part of the elastica interna becomes atrophic and part hypertrophic, and that the quantities of each may vary to all extremes. If we now examine another such a vessel, cut in longitudinal section, so that the lumen of the new contained vessel can be followed for a long distance, a striking fact comes to light. The elastica interna courses down both sides of the new vessel separated from the latter by the now two interarterial spaces. If we enumerate the structures from one side to the other we have:

a. Atrophic or hypertrophic elastica interna (with possibly some remains of old media).

b. Interarterial space.
c. New media.
d. Endothelium.
e. Lumen.
d′. Endothelium.
c′. New media.
b′. Interarterial space.
a′. Atrophic or hypertrophic elastica interna.

Now we find that the elastica interna does not become atrophic on one side of the vessel throughout the whole course of that vessel; if we follow it down one side throughout its course it becomes alternately atrophic (yellow) and hypertrophic (black), and where it is hypertrophic on one side at a certain level, it is almost always atrophic on the other side; so that at any cross-section A and A′ are hypertrophic and atrophic, respectively, or the reverse is true.

Another statement is also emphasized by the examination of such a vessel, and that is that the interarterial space also shows the same variations. In other words, where the elastica is atrophic the interarterial space is either hyaline or fibrous (red); whereas, where the elastica lying outside of it is hypertrophic, this same space is filled with a newgrowth of elastica (Fig. 8).

This only goes to prove that atrophic elastica interna is dead tissue and therefore cannot reproduce its kind. Why, as asked before, the elastica interna should show this variability of atrophy and hypertrophy, is a question which will not allow of a satisfactory answer at the present day, but the alternation of sides of hypertrophy and atrophy only lend strength to the theory advanced in the foregoing pages, that pressure of the contracting uterus causing muscle bundles to impinge more on one side of a vessel than on another is a possible and plausible explanation. By such compression the vasa vasorum would suffer very unequally and cause unequal change in the tissues which they supply. One is apt to forget in the study of such arteries that they depend almost solely for their nutrition not upon the blood which flows in their lumen, but upon the blood supply in the vasa vasorum.

The vein walls in this specimen have become almost a solid mass of elastic tissue. In such a specimen muscular tissue seems to have had no chance to re-form and increase, and its place has been taken by an hypertrophy of elastic tissue, not only in the hyaline masses of the vein walls, but throughout the uterus. The result is that the projections into the lumina of the veins, caused primarily by the hyaline masses, have here become but masses of elastic tissue; and the corresponding increase of elastic fibers throughout the uterine musculature makes this organ in this respect the most marked departure from the normal in my series of cases.

INVOLUTION OF THE CERVIX OF THE PUERPERAL UTERUS.

The cervix uteri undergoes involution in a manner similar to that of the body of the uterus. The musculature undergoes a rapid fatty degeneration, but the fibrous tissue degenerates through hyaline changes. But particular interest attaches to the changes in the cervical vessels.

In the normal nulliparous cervix, as Duhrssen and others have described, there is almost a total absence of elastic tissue, except under the squamous epithelium and along the outer margin of the cervical tissue where it is bounded by broad ligaments, bladder and peritoneum. The tissue proper of the cervix is relatively free from elastic tissue and the venous walls contain but a trace. There is almost a total absence of elastic tissue in the adventitia of the arteries, and in the thick wall of muscle which forms the media, the elastic fibrils are exceptionally fine and few. The elastica interna is delicate for the size of the vessel.

The cervix undergoes involution almost *pari passu* with the uterine body. But as the arteries have undergone but a slight enlargement—slight as compared with that of the placental area, though not markedly less than those of the lower uterine segment—we find that the reduction is brought about by a much less pronounced but similar process to that employed in the uterus. One finds that the vessel is reduced by an atrophy of its elastica interna, and a corresponding swelling and atrophy of the elastic tissues of the media; and that, similar to the steps in the uterus, the muscle fibers invade the lumen, and form a new portion of media, which corresponds in thickness with the reduction necessary. Now, as this amount of reduction does not vary in different parts of the cervix as it does in different parts of the uterus, it is always found that when the medial tissues have invaded the lumen sufficiently to reduce it to the required size it is always found that the old elastica interna lies removed from the lumen by a band of newly-formed muscle equal to about one-third that of the whole media. In other words, the old atrophic elastica interna lies between the inner and middle third of the media. Now, in normal involution, the change and ingrowth is formed with great rapidity; and the remains of the old elastica interna are surprisingly quickly absorbed. But in cases such as those last described where tissue change and absorption are slow and incomplete, it is not uncommon to find in nearly all the vessels hypertrophic remains of the old elastica interna, under which circumstances the invading muscle fibers become richly clothed in elastic tissue, and the new elastica interna is usually of inordinate thickness. It is surprising how soon in normal cases the whole cervix looks as if not a fiber had been degenerated. The outer third of the media now undergoes a fatty degeneration and disappears. Now it will be readily gathered from the foregoing that such pads of elastic tissue as found about the vessels of the inner third of the uterus about the placental site are an impossibility owing to two reasons: first, because the reduction in size is never so great as to cause the old elastica interna to lie outside the new vessel (it being always found in the media); and, secondly, because the amount of elastic tissue in the cervix about the vessels is so small as to be hardly taken into account.

That the fibrous tissue of the cervix undergoes hyaline degeneration and is subsequently absorbed to the proper degree of reduction, and that the muscle fibers undergo fatty degeneration can be seen most beautifully in some sections cut in such a manner that the two tissues lie in layers. In such a preparation, stained by hematoxylin and Soudan III, the alternate fat-free and fatty layers make a striking demonstration of the above fact. The veins of the cervix undergo changes similar to, though less pronounced than, those of the body of the uterus.

THE UTERINE ARTERY AND VEINS.

Do the uterine arteries and veins undergo changes similar to those of the uterus proper?

An examination of the uterine arteries in nulliparous patients shows that they are very frequently the seat of numerous hyperplastic intimal layers, and in cases of chronic disease the intimal changes are as varied perhaps as the diseases that cause them. The arteries of the multiparous of the same age show similar hyperplastic layers so that it is quite impossible to determine from an examination whether a woman is parous or not. But, from the examination of specimens of women who had undergone labor in the previous weeks or months, there is every evidence of changes going on in the uterine arterial musculature, and signs of instability of elastic tissue which here and there is intensely swollen and frequently stains a deep red. The reduplications of the elastica interna are less completely formed than in the quiescent uterine state, and the musculature which is so frequently found between these reduplications is more or less imperfectly formed in the red homogeneous mass that often intervenes.

These signs all point to the fact that the uterine artery reduces its caliber not only by contraction of its musculature, but by the building of one or more hyperplastic layers. But these, as pointed out above, can be distinguished from the same layers sometimes found in the nulliparous uterine arteries only by the evidence of newly-formed tissue.

A great deal more material will have to be examined to place the question beyond a doubt.

The uterine veins do undergo a change similar to those of the uterus, but it is less pronounced, and in consequence of the better blood supply it is more rapidly carried out.

A careful study of the foregoing findings allows one to deduce certain facts that are of great interest to pathologist as well as to the scientific obstetrician and gynecologist. There is no organ in the human body which undergoes such a veritable storm of tissue change as does the uterus after pregnancy. As a direct consequence, it is equally true that there is perhaps no organ in the body which affords such opportunity for the study of tissue change.

It will have been gathered from what has been written that the uterine muscle undergoes fatty degeneration which begins earlier than forty-four hours after labor. The degeneration is not uniformly distributed throughout the uterus but exercises a selective influence for which it is impossible to assign a plausible cause. The surface of the torn mucosa is one of the first places to show the change, and the muscle of the media of the old vessels which eventually totally disappear is early involved and early disappears completely. But the fatty degeneration of the new superfluous muscular tissue in the "interarterial space" is a later development. Hence my findings are just the opposite of those of Balin who states that fatty degeneration of the arterial wall is a late change. The reason for this contention is evident.

That the muscularis of the media in most cases disappears completely has been shown very frequently, so that Sänger's conclusions as well as those of Heschl are at variance with mine, but I most heartily support those of Kölliker who maintains that some of the muscle fibers do perish. But how he came to that conclusion except upon purely theoretical grounds, it is difficult to realize, for it has been impossible for me even with the latest methods of staining, etc., to tell whether, apart from the media of vessels, the uterine muscle fibers perish or simply reduce their size.

The fibrous and elastic tissue of the uterine wall and arteries undergo a hyaline swelling and are absorbed in a manner similar to that of the hyaline core of a corpus luteum. Whether fatty changes enter here to hasten the process, I doubt very much; though it often seems as though certain fibrous tissue strands contain cells filled with fat droplets, but it is impossible to exclude certain isolated muscle cells in such bundles.

If one can draw from the changes in the cervix conclusions for the uterine body, it is certain that the connective tissues do not undergo fatty degeneration.

The arteries of the subplacental area, in fact all those which assisted in the blood supply to the placenta, build an entirely new vessel in the interior of the old one. On the other hand, vessels, upon which the demand during pregnancy was not so great as that upon those supplying blood to the placenta, build a new vessel in the lumen of the old one and incorporate into their own wall as much of the wall of the old vessel as they require to complete their media. The complete walls of the old vessel in the former class of artery and the superfluous part of the wall of the old vessel in the second class of artery are in normal involution completely absorbed. But in a very large percentage of cases causes operate to prevent the complete absorption of these remains of the parent vessels, which had hypertrophied so during the pregnancy.

One of the most potent factors in causing this lack of tissue change preparatory to absorption is found in age and multiparity.

Therefore the uterus renews its system of arteries after each pregnancy; some renew all their walls so that a completely new vessel remains. In other cases the renewal involves the intima and elastica interna together with a large or small amount of the media, depending upon whether the vessel has to greatly or slightly reduce its caliber.

A study of the uteri of the parous women of my series shows that those who bore children late in their sexual life have a strong tendency to retain unabsorbed remains of the hypertrophied vessels of their last pregnancies. But in young primiparæ who are healthy and whose parturition and puerperium were normal we should not expect to find any at all of this residue, or at least but the slightest trace of it. These two last statements may seem rather singular, in that age should cause such a difference, but it is hard to draw the line between physiology and pathology. I have but to recall the marked differences in the vessels about an atrophic corpus luteum to find a very marked analogy. About such a corpus in the ovary, the same arterial changes take place as in the uterus after pregnancy. So alike are the changes that one is tempted to speak of ovulation and the atrophy of the corpus luteum as a pregnancy and involution in miniature. Yet about the corpus luteum in a young adult, the arterial changes are rapid and not a trace of the old vessel remains, whereas in an elderly adult the whole ovary is filled with unabsorbed hypertrophic elastic tissue—the remains of the enlarged vessels of ovulation. So that what would be pathological in the ovary of a young girl or woman becomes normal for the woman advanced in her sexual life.

But there are many causes which may operate in causing the uterus of the young woman to resemble that of the aged. It would be impossible to enumerate all of these causes singly, but they may be put into a single class, and summed up in a few words. They are causes which, operating locally or generally, reduce the regenerative power of the tissues and the absorptive power of the body.

In this way can all the chronic inflammatory diseases, blood dyscrasias (several notable cases of pernicious anemia fall into my series), and possibly malignant growths, modify the normal complete involution. Hence one sees why, in the cases of chronic tuberculosis detailed above, though the patients were twenty-one, twenty-seven, and thirty-five years of age, they had so much unabsorbed functionless products remaining *in utero,* and why case VI who had had chronic Bright's disease followed by acute yellow atrophy should present such an intense degree of incomplete oxidation of tissue. Such cases must be looked upon as abnormal though the same degree in a woman of forty-five would be hard to classify as physiological or pathological.

Yet it is possible to see how age can and does operate in much the same way as a chronic disease in the young. The whole question of tissue change resolves itself into one of regeneration and degeneration with absorption. It is evident that as the patient grows old the body activities grow slower and slower. Tissue change is carried out much more slowly in the aged than in the young adult, and oxidation is less complete. So can disease by sapping the vitality of the young individual cause a slowing and an incompleteness of the tissue changes similar if not perhaps more marked than those brought about by increase in years.

Certain factors go hand in hand, and a consideration of them throw considerable light upon this difficult question. From a careful study of my specimens it is evident that the more rapid the involution, the more is it complete. It seems equally certain that the more rapid the reduction in the size of the uterus the more complete are the destructive changes preparatory to absorption. Whether a direct dependence exists between uterine contraction and retraction on the one hand and degenerative tissue change and absorption on the other is a question which it is quite impossible to answer with any degree of certainty. If one can draw conclusions from analogies one must assume that uterine contractions and retraction need not play any part whatsoever in the causation or rapidity of tissue change. That conclusion is forced upon us by the similarity of the changes in ovulation sclerosis, where contractions are entirely absent.

In all my cases, with one exception, the uterus was a great deal larger than normal. But it is impossible to know whether the uterine contractions were inhibited owing to the acute or chronic disease, and that therefore the changes were slow and incomplete, or whether the disease operated upon the tissue changes only, causing them to be imperfectly carried out, and as a sequence the uterus had to remain large, or whether as seems at first more plausible the chronic disease makes itself felt both upon the uterine musculature causing weakening of its contractions and simultaneously the same cause retards tissue change. That the two conditions, enlargement of the uterus and abnormal absorption of functionless tissue, usually go hand in hand is well borne out in my series. But that they are necessarily associated, that there is a relation of cause and effect between them, I think is completely negatived by the abnormal amount of unoxidized tissue remaining in Case IV. Yet that same uterus had undergone complete hyper-involution. But whether or not the degeneration is dependent upon uterine retraction, nevertheless tissue degeneration and uterine retraction are strongly influenced by disease of almost any acute or wasting kind. So it happens that in healthy individuals such a destructive force is brought to bear upon the tissues of the uterine vessels that their walls slowly degenerate and are absorbed. In diseased conditions and in advanced age that destructive force, acting less forcibly, causes an irregular degeneration of tissue. In some parts the tissue is as completely destroyed as in normal young primiparæ, but in other parts that same force destroys the highly developed muscular tissue but causes a stimulation of the lower types, namely the elastic and fibrous. And the same obtains in the regeneration processes. They too are weakened by these same causes so that the fibrous and elastic elements are often reproduced where the more highly specialized muscular tissues fail to reproduce themselves, and as the elastic tissue is a better substitute for muscle than is fibrous tissue, and as elastic tissue tends to multiply more in the young adult than does fibrous tissue (Jores and Aschoff) we find that the elastic elements completely outway the fibrous elements in this reproduction under weakened anabolic conditions. So it is that age as well as desease tends to weaken this unknown force, whether uterine contraction or other, so that destructive changes are less complete, causing the highly specialized tissue to succumb and the less specialized to hypertrophy, and acting as a vicious circle the same weakened condition causes lack of regeneration of the higher tissues and a corresponding increase in the less specialized.

If the disease is a more or less acute one, periods of activity and of quiescence may alternate. These, if of sufficiently long duration, that is, if not too frequently repeated, will have the influence upon the uterus of several successive involutions, resulting in alternations of periods of cell destruction and regeneration on the one hand and of cell differentiation on the other. The uterus will then show in its vessels, not a single step from the large vessel of pregnancy to the small vessel of complete involution, but a series of vessels lying one within the other.

Another point of interest in the series is the question of the development of the so-called "hyperplastic intimal layers" found by several authors in the general circulatory system, and so well described by Jores in his monograph on "Arteriosclerosis." Thomas and his school contend that the growth of hyperplastic layers is a result of slowing of the blood stream and lowering of blood pressure. He came to this decision, owing to the increase in the intima of the fetal umbilical vessels, after the placental circulation had been cut off by severence of the umbilical cord. Owing to the blood being directed into new channels the intimal layers increased to reduce the lumen. From this special case he made a general application of his theory that hyperplastic changes in the intima are due to the two causes given above.

Later it was found that such hyperplastic intimal layers take place throughout the general arterial system, and is not confined, as Thomas thought, to the intrafetal vessels coursing to and from the umbilicus. From the fact that these are found generally throughout the body, from the fact also that they grow gradually more numerous from childhood on to thirty years of age, from the fact also that they occur in hypertrophied conditions, Jores was led to refute Thomas' theory and to contend that the production of these layers is an index of hypertrophy called forth by the increasing blood pressure as the child advances in years to manhood. It has been stated that many of the arteries in the uterus at the end of preganacy show the development of hyperplastic intimal layers where previously they were absent. From this it would seem that the increased work and pressure put upon the arteries had called forth the building of these layers to strengthen the walls. This would certainly be in accord with the theory of Fuchs and Jores. But we also find that in many vessels which have to reduce their lumen but slightly this is brought about in a manner that is similar in every detail to that of building an hyperplastic layer. Now in such a case the cause of this newgrowth is certainly not an increase in blood pressure, but is a condition analogous in almost every circumstance with that of the intrafetal umbilical vessels. In such an uterus the building of the hyperplastic layer is an endeavor on the part of the artery to reduce its caliber to the demands made upon it, just as Thomas found in the vessels of the newborn. My work certainly seems to prove that both Jores and Thomas are right in their theories, and that lowered blood pressure and slowing of the blood stream on the one hand, as well as high blood pressure and increased work on the other, may call forth the same results.

It would be impossible to lay too much stress upon the unequalled facilities which the puerperal uterus offers for the study of the elastic tissue.

So uniform are the changes in the elastica interna, that one can state with the greatest certainty that the elastica interna, in undergoing degeneration of any kind, be it that of preparation for absorption as in the puerpueral uterus, or that of degeneration preparatory to calcification, passes through a series of stages which always bear the same order, each successive one being a further step in the degeneration.

These steps in a Weigert and Van Gieson preparation are as follows:

The elastica begins to swell to enormous proportions, but the swelling in several vessels of the same specimen is proportionate to the thickness of the elastica when in the normal state. Coincident with the swelling, the fibers begin to lose their black stain with Weigert, and become a deep port-wine red. At first this change affects only the sides of the elastica interna, so that the now thick black band is bordered on each side by a hyaline dark red line. This latter gradually encroaches upon the black center until the whole is converted into a red hyaline mass. But the sides always have progressed slightly farther in the change than has the center, and have grown paler. In the dark red hyaline tissue, black dots and irregular wavy lines account for the darkness of the red. At times the change of color begins in the center of the fiber and causes the two still black borders to widely diverge from one another, to perhaps reunite a distance further where the elastica has not undergone degeneration. The subsequent stages consist in a gradual loss of staining properties even with the Van Gieson stains. Following upon the dark red color, the transition is to a pale red hyaline tissue, then pale brick red which fades into yellow and finally colorless. Before elastica interna can be absorbed it must undergo these changes. But at a certain stage of its downward course its properties of elastic tissue are lost for ever. That point seems to lie between the dark red and the bright red hyaline tissue.

Now wherever elastica interna is in a state of unrest, and is undergoing degeneration, these changes occur. Not only does this apply to the puerperal uterus, but also to true arteriosclerosis. Jores writes that the first traces of degeneration in an arterial wall begin about the hyperplastic layers and, to be more exact, about the elastic laminæ which clothe the hyperplastic intimal layers on both sides. This degeneration manifests itself in fine fatty changes about the elastic tissue. Examination of such specimens when stained with Weigert and Van Gieson shows that the area of beginning degeneration manifests itself as a red area on the outer or inner side of the elastica interna, or that it may begin in the middle of the interna and by its swelling separate quite widely the outer sheaths of the elastica. This dark red hyaline tissue stains slightly with Sudan III, as do all the forms of atrophic elastica interna which has been described in the previous specimens. This red hyaline tissue has been described by many as a growth of fibrous tissue within or outside of the elastica interna. Not infrequently beginning calcification is seen in such modified elastica and is generally the seat of such change in all calcifications of the uterus. Sections of Case V present in several places a complete obliteration of the uterine vessels in the inner third of the uterine wall. The elastica interna in these has not been completely destroyed but stains a deep red, and parts of the media remain. Yet in such specimens calcification has gone on to a marked degree involving the whole of the elastica interna, but ceasing sharply where the elastica interna ceases. Yet the patient was only twenty-nine years of age.

Ordinary elastic tissue of the media must undergo somewhat similar changes when undergoing degenerative changes. It first becomes a dark red and later a bright red, and as such becomes indistinguishable from ordinary hyaline connective tissue.

Jores, drawing his conclusions from purely theoretical considerations, states that elastic tissue is produced from adult elastic tissue and from elastic tissue only. Basing my arguments upon my findings, I have come to the opinion that elastic tissue is not produced by adult elastic tissue but that the latter must revert somewhat before it can reproduce its kind. In other words, adult elastic tissue must undergo certain changes before it can multiply. If we study an area where elastic tissue is multiplying we find that intermixed with the hypertrophic fibers, and closely incorporated with them there is a dark red hyaline tissue which advances before the black Weigert-stained fiber does. An artery which has an interarterial space filled with a pale red homogeneous hyaline tissue frequently begins to be invaded by elastic tissue. Under such circumstances one sees an ill-defined dark red tissue invading the pale hyaline tissue. This dark red invading substance at first is free from formed elements, but farther from its advancing edges the oil immersion reveals black points beginning to appear in the matrix. Still further back these dots give place to larger bodies which finally fuse into a black fiber.

The veins reduce their growth not by a thrombosis and canalization as was previously thought, but by a development of hyaline tissue in the wall of the vessel. This method of reduction of the lumen is wide-spread throughout the uterine body and cervix, and we have seen that this provisional rapid growth is slowly replaced in the normal young healthy individuals by muscle tissue, but by a more or less wide-spread substitution of the muscle by elastic tissue in the older woman and in chronic disease.

CONCLUSIONS.

The conclusions to be drawn from the study of these cases may be concisely quoted as follows:

1. That the uterus renews all its arteries after each pregnancy; the renewal always consists in the building of a new vessel within the lumen of the old one. In case of a small vessel being built within one of very large caliber, *i.e.*, vessels that supply

the placenta, the new vessel will have three completely new coats, intima, media, and adventitia.

In the case of a vessel which has to reduce its caliber but slightly, *i.e.*, ordinarily vessels that do not take part in the placental supply, the new vessel will build for itself a new intima and incorporate as much of the media of the old vessel as it required to complete its wall.

2. That the walls of the old vessels, which have become superfluous slowly undergo in normal cases destructive changes and are completely absorbed.

3. That under the influence of advanced age, or chronic wasting or acute disease the destruction and absorption may be very incomplete.

4. That the differences between the parous and nulliparous uterus arise out of the incompleteness of destruction and absorption of waste products.

5. That the parous uterus in a young woman in healthy condition can return to so resemble the virgin uterus (microscopically) as to be indistinguishable from it. This however is the exception and not the rule.

6. That the changes in the walls of the vessels of the uterus are closely allied to those about the atrophic corpus luteum.

7. That disease either local in the pelvis or general renders the process of involution much slower.

8. That acute disease may cause a complete block in involution.

9. That alternating periods of exacerbation and improvement may cause conditions in the uterus resembling a series of involutions.

    a. That the tissues tend to differentiate during exacerbation, owing to the "block" in involution.

    b. That they tend to further involute, *i.e.*, destroy and construct during the periods of improvement, owing to the raising of the "block."

10. That in later years of sexual life and under the influence of disease the more highly specialized tissues have a strong tendency to be replaced by the less specialized, *i.e.*, muscle by elastic tissue.

11. That the arteries of the cervix undergo the same change as those of the uterus.

12. That the veins of the uterine body and cervix are everywhere reduced by a growth of hyaline tissue in their walls and not by organization of clot.

13. That normally this hyaline growth is replaced by muscle which later in the case of very large vessels becomes formed into bundles to form new uterine muscular fasciculi.

14. That under the influence of age and disease this hyaline growth is replaced partly or wholly by elastic tissue.

15. That syncytial cells play no part whatsoever in the production of these venous changes.

16. That the large colorless masses found in the mucosa of the uterus of women who have borne children are the remains of atrophic elastic tissue and not the remains of organized blood clot.

17. That this unabsorbed dead tissue may remain at least ten months, but probably very much longer and is the most positive sign of a foregoing pregnancy.

18. That when elastic tissue of the parent vessel remains *in utero* unabsorbed, it becomes either atrophic or hypertrophic. The latter unless disturbed by a subsequent pregnancy will remain throughout the woman's life and constitute the so called sclerosis of pregnancy.

19. That this unabsorbed hypertrophic elastic tissue may arise from the elastica interna, or from the elastic tissue of the media, and adventitia, or from elastic tissue invading the interarterial space, or from all sources combined.

20. That elastic tissue undergoes a fixed series of changes when undergoing degeneration.

21. That the muscle cells of the parent media undergo fatty degeneration at an early date in the process of involution.

22. That the superfluous cells of the interarterial space and the cells which replace the coagula in the placental vessels undergo fatty degeneration.

23. That this fat causes double polarization of a ray of light.

24. That the muscular cells of uterus and cervix undergo fatty degeneration with subsequent slow absorption of the fat.

25. That the fibrous tissues undergo hyaline degeneration with slow absorption of this hyaline substance.

26. That many of the muscle fibers of the uterus disappear completely, especially is this true of the media of the large arteries.

27. That the uterine arteries and veins probably undergo a slight reduction in their lumen in a manner similar to that of the arteries of the uterine wall.

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TERATOMA STRUMOSUM THYREOIDEALE OVARII.

REPORT OF A CASE.

BY

C. C. NORRIS, M. D.,

Instructor in Gynecology, University of Pennsylvania; Attending Physician, Maternity Hospital; Assistant Gynecologist and Obstetrician to the Philadelphia Hospital, Philadelphia, Pa.

(From the Laboratory of Gynecological Pathology, University of Pennsylvania.)

(With three illustrations.)

THIS tumor has been referred to under numerous names, as struma ovarianis, struma thyreoidea ovarii aberatta, thyroid tumor of the ovary, etc. Teratoma strumosum thyreoideale ovarii seems to be the most fitting, as this term definitely describes the classification of the tumor and, to a certain extent, explains its histology. Seven years ago Gottschalk called attention to a malignant ovarian tumor which he named folliculoma malignum ovarii. He believed that the tumor originated from a primordial follicle. Kretschmar soon followed with a report of a similar tumor, but considered it an endothelioma.

Five theories as to the possible origin of the teratoma strumosum thyreoideale ovarii have been advanced.

1. That they were metastatic from a primary cancer of the thyroid gland. This theory is not tenable because no cancer has been present in the thyroid gland and because of the well-known fact that thyroid cancers usually give metastasis to the bones.

2. That the teratoma strumosum thyreoideale ovarii is a secondary growth from a normal thyroid gland or a simple goitre. This theory was doubtless formulated on account of the histological appearance of the tumor and because of the fact that a certain proportion of the cases presented clinical evidence of struma of the neck.

3. Theory advanced by Kretschmar, that the tumor was an Endothelioma.

4. That it was a peculiar colloid degeneration of an ordinary adenoma of the ovary.

5. That it was a teratoma.

Pick pointed out that these tumors were simply ovarian embryomata in which there was a predominance of thyroid gland tissue. Since then other observers have studied these neoplasms, and Pick's conclusions have been confirmed.

According to Frank, there are but twelve positive cases of teratoma strumosum thyroideale ovarii on record. Anspach's case should, however, be added to this list. In the laboratory of gynecological pathology at the University of Pennsylvania, we have had two cases occurring among 2,300 gynecological specimens which represent about 7,000 gynecological patients. One hundred and forty of these patients suffered from ovarian tumors.

The etiology of this tumor is somewhat obscure. Whether they originate from ectopic blastomeres or from fertilized polar bodies, has not been definitely determined. They usually contain tissue from all three germinal layers.

Viewing the tumor from the clinical aspect, the patients vary from twenty-one to fifty-seven years of age. Ascites is often present. The tumors are of rapid growth and give symptoms similar to other malignant ovarian neoplasms. Adhesions are of frequent occurrence and as a result pain is often a prominent symptom. In a certain proportion of cases menstrual irregularities are present. The tumor seems to attack primiparas and nulliparas with equal frequency.

In none of the cases on record has the tumor been bilateral. Bilateral embryomata are, however, frequent; and if it were possible to collect a large series of teratoma strumosum thyreoideale ovarii, no doubt some bilateral tumors would be found.

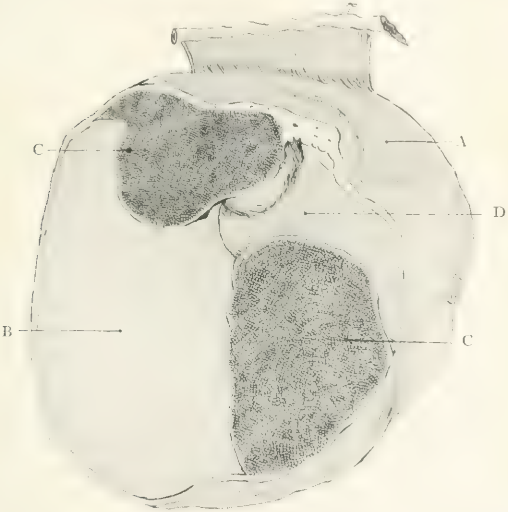

FIG. 1.—Teratoma Strumosum Thyreoideale Ovarii. A section from the lateral surface of the neoplasm to show the character of its contents. A is the external surface which is grayish-white and glistening in appearance. B is the cystic cavity, partially lined by skin from which a few hairs are growing, and which was filled with buttery material. C C are sections of thyroid tissue. D is another lobule of thyroid tissue.

In four of the thirteen recorded cases, an enlargement of the thyroid gland was present. Although the tumor is undoubtedly malignant, the percentage of ultimate cures is considerably greater than in the case of carcinoma of the ovary. Of the thirteen authentic cases, one died two years after operation of a recurrence. Four were well two years or more after operation. In two cases, the report was made shortly after the operation, and in four cases the after-result is not mentioned in the report.

In common with most ovarian tumors, the recurrence, when it takes place, is usually local and is similar in histological character to the original tumor. These tumors being of a very rapid growth, recurrence is likely to take place in less than two years.

Thyroid tumors of the ovary vary considerably in size; being embryomata, and hence having a congenital origin, there is no reason that such neoplasms of extremely small size should not be found. Simple embryomata (frequently improperly designated as dermoid cysts) may appear in the fetus. The recorded thyroid tumors of the ovary vary from about eight to eighteen cm. in diameter. The surface is usually whitish, grayish, or pinkish in color, and is frequently more or less covered with adhesions. The capsule is composed of dense connective tissue which varies from a few mm. to .5 cm. in thickness. The tumor may be solid, as in Kretschmar's case, or comparatively cystic as in Anspach's case. The diagnosis must, however, depend on the amount of thyroid tissue present. It is not uncommon to find a small area of thyroid tissue in simple embryomata. In a careful study of twenty-one so-called dermoids, Pick was able

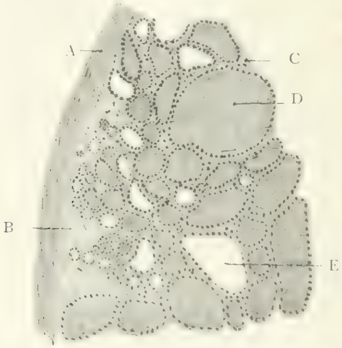

FIG. 2.—A is the capsule which is composed of fibrous connective tissue, at B is an outgrowth of fibrous connective tissue penetrating into the tumor substance. These outgrowths of fibrous connective tissue make up the septa which can be seen running through the tumor even in the gross specimen. C is the stroma composed of loosely arranged bundles of fibrous connective tissue. The stroma is rich in blood-vessels; at D one of the acini is dilated and contains colloid material, epithelial débris, and degenerated red blood-corpuscles; it is lined by cuboidal epithelia. The acini vary considerably in size. The greater number contain colloid material, although a few are empty, as at E.

to demonstrate thyroid tissue in six. This is undoubtedly a very high proportion in which to find thyroid tissue, but the fact that it not infrequently is present in small amounts, is well known. The thyroid tissue should predominate before a diagnosis of teratoma strumosum thyreoideale should be made. Occasionally these tumors are multilocular, but the greater number are unilocular. The amount of cystic space is small compared with the size of the tumor. Under the microscope, the various elements derived from any or all of the three germinal layers, may be present. The most frequent tissues found are skin, sweat-gland, hair follicles, bone, and teeth. The thyroid tissue may be identical to the normal throid or, as in our own and in Uliska-Stroganowa's case, the thyroid tissue may show a distinct adenomatous character. Many of the acini contain colloid material, degenerated epithelium and red blood cells. In some cases the malignant character of the tumor can be easily determined by the microscope. In others clinically malignant symptoms have been present, although the histological picture in the primary tumor has been that of a normal thyroid gland or benign adenoma. It should be born in mind that it is practically impossible to cut an entire tumor for microscopic

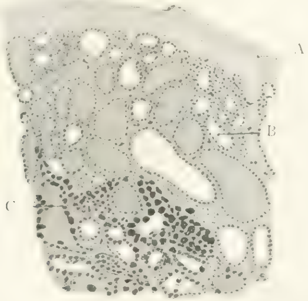

FIG. 3.—Malignant area in tumor. A Capsule. B Thyroid tissue. Many of the acini contain colloid material. The investing epithelium consists of a single layer of cuboidal cells. At C the thyroid tissue is penetrated by the carcinoma. The cancer cells vary greatly in shape, size and staining properties. Penetration of the basement membrane has taken place at one or two points. Reduplication of the epithelium is also present. The advancing border of the carcinoma is surrounded by a border of acute inflammatory reaction. The chief diagnostic feature is the deep staining of the cancer cells and their marked irregularity in size.

examination and that relatively only a very small part of any given tumor can be examined histologically; for this reason it is not at all improbable that a small malignant area may have been overlooked in those cases which were microscopically benign tumors, but which gave clinical symptoms of malignancy, such as recurrence, etc. The author is inclined to the belief that the malignancy of the tumor can be definitely determined by the microscope if a careful examination be made. It is well, however, in all cases of teratoma strumosum thyreoideale ovarii, to give a guarded prognosis. The actual proportion of ultimate cures in these cases is difficult to determine, owing to the scanty literature on the subject. Both cases from our laboratory are free from recurrence to date. The first (Anspach's case) has been free from recurrence for six years while the second case was only operated on six months ago. Frank has recently collected data from nearly all of the authentic cases on record. I have quoted freely from his excellent article to which the reader is referred for a more critical study of the case.

REPORT OF A CASE OF TERATOMA STRUMOSUM THYREOIDEALE OVARII.

Gyn. No. 2900. Age fifty-one.

Marital History.—Married thirty-two years, two miscarriages and two children. The youngest child is twenty-six years of age.

Menstrual History.—Regular up to two years ago. Since then every two to five weeks. Last period four weeks ago.

History of Present Illness.—The chief symptom is irregular bleeding. Two years ago, the menstrual periods became irregular and since then have been getting progressively worse. Sometimes the bleeding occurs two or even three times a month and at other times there are intervals of freedom from hemorrhage lasting five weeks. As a rule, however, the bleedings occur about twice a month. The bleeding lasts from two days to two weeks. The last hemorrhage lasted four days. The bleeding is, as a rule, profuse, bright blood being passed, but no clots. A moderate amount of yellowish leukorrhea has been present for a year or more. The patient sleeps well. She has occasional frontal headaches and slight frequency of micturition.

The general physical and abdominal examinations were negative.

Pelvic examination revealed a cystocele and rectocele, and a medium-sized ovarian tumor apparently springing from the right side.

Operation.—April 19, 1909, by Dr. John G. Clark.

After a median incision had been made, the diagnosis of ovarian cyst was confirmed. The usual salpingo-oophorocystectomy was performed, and the appendix which was slightly adherent was removed. The abdomen was closed by the usual layer method, and the cystocele and rectocele were repaired.

The patient made a normal convalescence and was discharged, cured, two weeks after operation.

PATHOLOGICAL REPORT.

Macroscopic Description.—The specimen consists of the right tube, an ovarian tumor, and the vermiform appendix.

Right tube measures 8 cm. in length, and is entirely normal except for a small supernumerary abdominal ostium, situated on the dorsum of the tube, 1 cm. from the distal extremity.

Right ovary has been converted into a rounded semi-cystic tumor which measures 18 cm. in diameter. The surface presents a few adhesions. It is grayish-white in color, and here and there contains pinkish areas due to the congestion of numerous blood-vessels and capillaries. The surface is glistening in appearance and not unlike the tunica albuginea of the normal ovary. At one point a small recently ruptured Graafian follicle is present. On section, the tumor is found to contain a single cystic space which makes up about one-half of the bulk of the entire neoplasm. This contains thin buttery-like material intermingled with which are a few short curly dark hairs. The capsule which surrounds the tumor is a tough leathery membrane, varying in thickness from two to five mm. About one-half the cyst is lined with skin from which a few sparse hairs are seen springing. The portion of the loculous which is lined by skin corresponds to the solid portion of the tumor. On section through the latter, this is seen to consist of a dark reddish-brown tissue, which is somewhat translucent in appearance. This tissue is made up of closely packed small cystic spaces which present a somewhat honeycomb-like appearance. These cystic spaces vary from microscopic in size to 2 mm. in diameter. They contain a viscid, translucent, reddish-brown material. This tissue is quite soft and very vascular. Areas of hemorrhage and fibrous overgrowths of the grayish-white intercystic tissue can be seen at some points. This type of tissue makes up the entire solid portion of the tumor with the exception of the capsule and a thin septum of fibrous connective tissue which separates it from the above described cystic cavity.

Vermiform appendix. Measures 6.5 cm. in length. With the exception of a few surface adhesions, it presents no gross lesions.

HISTOLOGICAL DESCRIPTION.

Right tube is normal.

Ovarian Tumor.—The capsule is composed of dense fibrous connective tissue. It is poor in blood-vessels. The dark reddish solid part of the tumor, mentioned in the macroscopic description, consists of numerous acini. These are lined by a single layer of cuboidal epithelium which rests upon a basement membrane. This epithelium possesses a distinct cell outline. The protoplasm is finely granular. The neuclei are central or slightly basal in location and stain well with hematoxylin. The acini contain colloid material which stains pink with eosin. Epithelial débris and degenerated red blood-corpuscles, and at some points a few leukocytes, are also present. The stroma, which is fairly abundant, is made up of loosely arranged connective tissue. Numerous congested blood-vessels, some of which are of unusual size, are present. Small capillaries can often be detected surrounding the ascini. This tissue is identical to the tissue of the normal thyroid gland. Other areas show the indistinct acini dilated; in these the epithelium is noticeably flattened and the cell outlines less distinct. These fields suggest and indeed could not be distinguished from an ordinary colloid adenoma of the thyroid gland. Still other areas present undoubted evidence of malignancy. At the latter points the acini are very variable in size. The epithelium is reduplicated, two, three, and even four layers being present. The cells vary in size, shape and staining properties. At some points, the epithelium can be seen breaking through the basement membrane, and here and there small clusters or isolated epithelial cells are present in the stroma. The thyroid character of the tissue is, however, still more or less preserved. Surrounding the malignant area, is a well-defined zone of acute inflammatory reaction, characterized by an infiltration of serum and polymorphonuclear leukocytes. Between the thyroid tissue and cystic cavity, noted in the macroscopic description, and lining the latter, is a thin layer of skin covered by stratified squamous epithelium and containing sweat glands and hair follicles.

Vermiform Appendix.—Beyond a few vascular adhesions, the organ is normal.

Pathological Diagnosis.—Normal tube (supernumerary abdominal ostium). Teratoma strumosum thyreoideale ovarii (presenting in some areas a distinct malignant change). Periappendicitis.

The prognosis, as far as can be judged from the pathological examination, should be favorable for ultimate cure, as the malignant area is encapsulated and does not penetrate the capsule of the tumor, nor are any malignant areas found in the pedicle.

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APPENDICITIS COMPLICATING PREGNANCY, LABOR, AND THE PUERPERIUM.

BY
PALMER FINDLEY, M. D.,
Professor of Gynecology, College of Medicine, State University of Nebraska, Omaha.

(With two illustrations.)

WE note with interest that Edebohls, in his "Review of the History and Literature of Appendicitis," refers to a case recorded by Mestivier in 1759, in which a woman in the eighth month of gestation suffered an attack of appendicitis. This record, however, is not verified.

The first authentic record of appendicitis complicating pregnancy appeared in the *Lancet*, vol. ii, page 381, 1848. The case was reported by Hancock before the Clinical Society of London in 1848. Hancock drained an appendicial abscess in the fifth month of pregnancy, seven days after miscarriage. Recovery followed the operation.

It was not until some time after Fitz, in 1886, substituted the term appendicitis for typhilitis and perityphilitis, that cases of appendicitis complicating pregnancy were recorded. Credit is due Paul F. Mundé for the awakening of interest in the subject. His report of three cases (*N. Y. Medical Record*, Dec. 1, 1894; Oct. 26, 1895, and March 23, 1895) brought the profession to a realization of the importance of the subject, and from that time to the present cases have been reported with increasing frequency.

The second noteworthy contribution to appear was that of R. Abrahams (AMER. JOUR. OBST., Feb., 1897), in which twelve case records were added to the three of Mundé, and valuable clinical deductions were drawn.

In reviewing the literature, I find a rather striking uniformity of ideas as expressed by various authors. We may say that the later writers are in great measure in accord with the views expressed by Mundé and Abrahams.

In the past eighteen months, I have had seven cases of appendicitis complicating pregnancy, labor, and the puerperium. Following is a brief record of these cases:

CASE I.—Mrs. A., age forty-two, VIII-para, experienced a mild attack of appendicitis last summer. Since that time she has complained of tenderness in the region of the appendix.

I saw her April 25, in consultation with Dr. Byers, of Nickerson, Nebr. She was then in the third month of gestation, and had been vomiting persistently for three weeks, during which time she was unable to retain nourishment. There was tenderness and muscular rigidity over the appendix, obstipation, and general abdominal pains. Her pulse was rapid and weak, and throughout the lungs were coarse bronchial râles. Relief seemed imperative and, accordingly, I removed a thickened adherent appendix in the subacute stage of inflammation. Following the appendectomy, I emptied the uterus. I was assisted in this operation by Dr. Byers and Dr. Smith. The patient took the anesthetic badly. Within two hours of the completion of the operation, the bronchial râles were greatly exaggerated, the breathing rapid, the pulse rapid and weak, and death ensued at the end of forty-eight hours. Death was ascribed to exhaustion and to bronchopneumonia.

CASE II.—Mrs. B., age twenty-seven, married one year, o-para, last menstruation April, 1909. The case was seen in consultation with Dr. Dent, of North Platte, Nebr. There was an indefinite history of a mild attack of appendicitis in June, and again in August of 1908. October 13, 1908, when in the sixth month of gestation, she suffered a sharp attack of appendicitis, and three days later a spontaneous abortion occurred. This was immediately followed by increased pain and tenderness over the appendix. The pain spread throughout the abdomen. Abdominal distention, muscular rigidity, nausea, obstipation, rise in temperature and pulse rate gave evidence of a general peritoneal involvement. Such was her condition when I saw her three days after the miscarriage. Assisted by Dr. Dent and Dr. Quigley, I established free drainage of an appendicial abscess through an incision in the right iliac region.

Following the operation, there was temporary improvement. The temperature declined, vomiting ceased, the bowels moved, and the drainage was free. Death occurred October 23—the result of a general suppurative peritonitis.

CASE III.—Mrs. P., age thirty-six, V-para. There was a history of five attacks of appendicitis in the year preceding the present pregnancy. When first seen she was in the fifth month of gestation. She had lost large quantities of blood from the uterus in the past few days, and was suffering excruciating pain in the region of the appendix. There was no temperature. With the assistance of Dr. Bisgard, of Harlan, and Dr. Findley, of Sac City, Iowa, I evacuated the uterus. A rather severe attack of appendicitis followed on the second day, but speedily subsided under the care of her family physician, Doctor Bisgard. April 27, 1909, she entered the Clarkson Hospital for the purpose of having the appendix removed; having just recovered from another sharp attack of appendicitis. The appendix was found adherent to the cecum and contained pus. The uterus and appendages were normal. Recovery followed.

CASE IV.—Mrs. B., age twenty-three, o-para, married three months. Last menstruation six weeks prior to my consultation with Dr. Brown, of Lewis, Iowa, and Dr. Jones, of Griswold, Iowa. A tender, fluctuating mass, the size of a large orange, was found in the right iliac region. The uterus was somewhat enlarged and soft. On the following day an appendicial abscess was drained through an abdominal incision, and three days later a blood mole was expelled from the uterus. When a child she had had an attack of appendicitis, and from time to time she had suffered pain in the right side. An uneventful recovery followed.

CASE V.—Mrs. X., age twenty-eight, I-para. Referred by Dr. Hulle, of Griswold, Iowa. There was a history of previous appendicial attacks of a mild character. Three months before operation she gave birth to a living child and three days later there was an acute onset of appendicitis which ran a protracted course. Six weeks later, I removed the appendix, the tip of which was found adherent to the fundus of the uterus. (See accompanying figure.) Recovery followed.

Case VI.—Mrs. S., age twenty-seven, III-para. Case seen with Doctors Baldwin and Alliband, of Elliott, Iowa. Patient gave a history of several previous attacks of appendicitis. In her three labors she suffered severe pain in the region of the appendix and this pain continued for some days after child-birth. At midnight, February 11, 1908, she suffered very severe pain, which she thought to be labor pains, she then being within a few days of full term. Dr. Baldwin saw the case on the following morning. Within two days the tenderness involved the entire abdomen—there was vomiting, obstipation, temperature 102.5° F., pulse 110. It was at this time that I saw her and believed her to be in a dying condition. There were all the clinical evidences of a general suppurative peritonitis together with a full-term dead fetus *in utero*. No operation was attempted, and the patient died in a few hours.

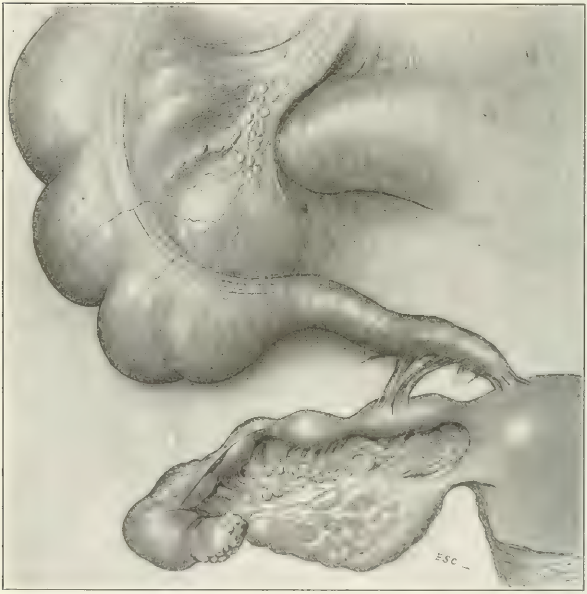

Fig. 1.—Appendix adherent to fundus of uterus and right Fallopian tube.

The postmortem disclosed a general suppurative peritonitis which had emanated from a gangrenous appendix. There were no evidences of uterine contractions, the dead child remaining *in utero*.

CASE VII.—Mrs. K., age twenty-seven, o-para, had suffered from several mild attacks of appendicitis, and throughout her present pregnancy there was more or less discomfort about the appendix. During labor, which occurred April 20, 1909, she suffered intense pain over the appendix, and two days after a normal delivery there was a rise of temperature to 101° F., with increased pain and muscular rigidity over the appendix. This subsided within three days.

The patient is advised to submit to an appendectomy soon after the end of the puerperium.

These cases emphasize several points of interest:

1. In all of the seven cases there had been previous attacks of appendicitis.

2. In five of the seven cases the attack of appendicitis preceded the uterine contractions, and in each instance the miscarriage or labor was followed by rapid development of the symptoms referable to the appendix.

3. In Cases II and VI there was a gangrenous appendix with abscess formation which rapidly spread to the general peritoneal cavity and resulted fatally.

4. In Cases IV and VI the fetus was dead *in utero*. In Case VI a blood mole was expelled three days after drainage of an abscess.

5. Of the seven cases, two died from septic peritonitis, and one from bronchopneumonia. One recovered after abscess formation, two recovered after sharp attacks with pus confined to the appendix, and one after a recurrent attack of the catarrhal variety. Death occurred in three of the seven cases—a mortality of 43 per cent. Of the three cases resulting fatally, one was not operated, making the mortality in the cases operated 33.3 per cent.

We do not find unanimity of opinion as to the causal relation of pregnancy to appendicitis. Halawacek affirms that pregnancy may incite a primary attack of appendicitis, while Fraenkel, together with the majority of writers on the subject, states that pregnancy exerts little, if any, influence upon the normal appendix that could bring about an inflammatory attack. All agree that a recurrent attack may be precipitated through the influence of pregnancy, labor, and the puerperium.

That primary attacks do occur in pregnant women is not strange, for it is in the child-bearing period that appendicitis occurs with greatest frequency.

Where one or more attacks of appendicitis have occurred prior to pregnancy or early in the course of pregnancy, there is great liability of a recurring attack in the course of the pregnancy or in the puerperium. Several factors conspire to bring about this event. There is an increased vascular engorgement of the appendix; the toxemias of pregnancy and the frequent accompaniment of constipation tend to excite an acute attack in a previously diseased appendix; in the early months of pregnancy and in the puerperium the cecum and appendix are crowded upon by the enlarged uterus and finally where adhesions have previously formed between the appendix and the uterus or its appendages, there is great liability of exciting an acute attack and of bringing on uterine contractions.

It is reasonable to assume that appendicitis occurs more frequently in relation to pregnancy and the puerperium than we have known because the mild attacks may be interpreted as discomforts incident to pregnancy, and the more severe attacks arising in the puerperium are doubtless often confounded with puerperal infection of the uterus and its appendages.

Effect of Appendicitis on the Course of Pregnancy.—Having considered the effect of pregnancy upon the origin and course of appendicitis, we inquire into the effect of appendicitis upon the course of pregnancy. Briefly stated, we find that mild attacks of appendicitis do not alter the course of pregnancy. In severe cases the rule is that pregnancy is interrupted and often with the result that the infection in and about the appendix extends to the general peritoneum, to the uterus and its appendages, and possibly to the fetus.

Boije cites eighteen cases of catarrhal appendicitis complicating pregnancy, and in none of these was pregnancy interrupted. Where pregnancy is interrupted the fetal mortality is high. The death of the fetus is ascribed to nonviability, toxemia, and septicemia. These factors explain death *in utero* and after birth. Hence it follows that the earlier the delivery in the course of a severe attack of appendicitis, the better the chances for living in a viable child.

Long-existing adhesions developing from a previous attack of appendicitis may incarcerate a pregnant uterus in the pelvis and lead to abortion in the absence of an acute attack.

Pathology.—In several cases the appendix has been found adherent to the fundus of the uterus or to the uterine appendages. (See accompanying figures.) This condition is doubtless a factor in the development of recurrent attacks, as the uterus develops in pregnancy and contracts during labor and the puerperium.

Abscess formations about the appendix have for their inner wall the uterus, hence the grave danger of liberating the pus by the contracting uterus in labor and the puerperium. This is probably the explanation for the development of general suppurative peritonitis in Cases II and VI. In but one recorded instance of the breaking of the abscess wall by the contracting uterus did the pus gravitate downward into the pelvis, leaving the general peritoneal cavity free from contamination. In this instance the pus was effectually drained through the vagina.

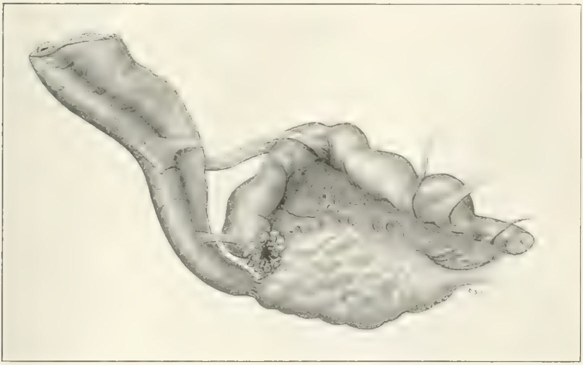

FIG. 2.—Appendix adherent to tube and ovary.

It is inferred from the records that a long appendix which hangs over the brim of the pelvis is more subject to inflammatory attacks in the early months of pregnancy and in the puerperium because of the encroachment of the uterus upon the appendix.

It has been demonstrated that the infection may pass from the appendix to the uterus by way of the tube and broad ligaments. In this manner, the colon bacillus has found its way into the tube, the uterine musculature, placenta, and fetus. Lepage found multiple abscesses in the uterine wall and believed they originated from an infected appendix. Lepage also reported a case in which the infection traveled from the appendix through the right tube, thence to the uterus, and finally involved the left tube.

No reliable information can be obtained from the literature on the relative frequency of appendicitis complicating pregnancy, labor, and the puerperium for the reasons, as stated, that the mild cases are often overlooked and yet more rarely recorded and the severe cases are often regarded as types of puerperal infection. Furthermore, in cases not subjected to operation, there is the possibility of error in diagnosis. Meyer collected fifty-two nonoperated cases complicating pregnancy, and of this number forty-three (82 per cent.) were of the simple catarrhal form; nine (18 per cent.) developed abscesses with six fatalities and three recoveries. In the fifty-two cases, there was a mortality of 14 per cent.

Sixty-nine operated cases of appendicitis complicating pregnancy were collected by Meyer and of this number forty-nine (71 per cent.) showed a gangrenous appendix with abscess formation. In more than half the number (58 per cent.) the attacks occurred in the first five months of pregnancy.

Twenty-eight cases were collected by Meyer in which the attacks occurred in the puerperium; 50 per cent. of these cases were operated, with a mortality of 36 per cent.

Treatment.—As a prophylactic measure, the rule should be that a woman in the child-bearing period who has experienced one or more attacks of appendicitis should be operated because of the liability of a recurrent attack in event of pregnancy.

Mild cases, according to Pinard, should be treated conservatively and operated at the end of the puerperium if the evidences of a diseased appendix persist. On the other hand, Fraenkel would operate all cases, both mild and severe, which recur in the course of pregnancy.

All agree that severe cases should be operated without delay. We have the authority of Davis for the statement that appendicitis complicating pregnancy runs a rapid course, hence the advisalibity of prompt interference in all but the mild cases.

When a severe attack occurs at or near the time of labor, the safest course to pursue is to terminate labor speedily and then to remove the appendix or drain.

Where an abscess has developed early drainage is advised in the fear that the contracting uterus may liberate the pus and lead to a general peritonitis.

Repeated mild attacks occurring in the course of pregnancy call for operative interference.

When operating in the course of pregnancy, every effort should be put forth to prevent miscarriage. Rest should be enjoined, opiates may be used freely, and during the operation the uterus should be exposed and handled as little as possible. If abortion or premature delivery cannot be prevented, the usual methods are pursued in the conduct of the case.

If the case is found in labor and there exists a circumscribed abscess in the region of the appendix, the advice of Gerster (Phila., Month Med. J., Mch., 1899) should be followed. To prevent as far as possible the rupture of the abscess into the abdominal cavity, he establishes drainage before proceeding with the delivery and to prevent the contamination of the genital tract in the process of delivery, the abscess cavity is packed with gauze, through-and-through sutures are inserted and tied, and the wound sealed with collodion; over this a dressing is applied and held in place by adhesive straps. The delivery is then effected, after which the wound is reopened to allow of drainage.

Finally, in severe attacks arising early in the course of labor and without evident abscess formation, the rule should be to facilitate labor and to remove the appendix at the completion of labor.

RESUME.

1. Pregnancy does not incite a primary attack of appendicitis, but recurrent attacks may be precipitated by pregnancy, labor, and the puerperium.

2. Severe attacks may be confounded with puerperal infection of the uterus and its appendages.

3. Mild attacks of appendicitis do not alter the course of pregnancy. Severe attacks commonly interrupt pregnancy and may lead to the death of the fetus either *in utero* or shortly after birth. Death of the fetus is ascribed to nonviability, toxemia, and septicemia.

4. A woman in the child-bearing period who has experienced one or more attacks of appendicitis should be operated because of the liability of a recurrent attack in the event of pregnancy.

5. Mild cases do not demand operative intervention unless oft repeated in the course of pregnancy.

6. Severe cases should be operated without delay. When occurring near the end of the period of gestation, or in labor, the pregnancy should be speedily terminated, immediately after which the appendix should be removed.

7. Where an appendicial abscess has formed, early drainage is imperative, in the fear that the contracting uterus which forms a part of the abscess wall may liberate the pus into the general peritoneal cavity.

8. When operating in the course of pregnancy, every effort should be put forth to prevent miscarriage. Rest should be enjoined, opiates administered, and during the operation the uterus should be handled and exposed as little as possible.

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INCARCERATION OF THE PREGNANT UTERUS.*

BY
RALPH WALDO LOBENSTINE, M. D.,
Attending Surgeon, New York Lying-In Hospital, New York City.

By incarceration of the pregnant uterus, we understand a condition in which, for one reason or another, the gravid retroverted or retroflexed uterus, as it enlarges, fails to rise out of the pelvis and above the promontory.

The incarceration may involve (and usually does involve) the entire body of the organ, or it may involve only *one portion* of the posterior wall. Technically the latter, we do not believe, should be regarded as a true incarceration, although even such a condition may give prominent symptoms, and may be difficult or impossible entirely to overcome.

Frequency.—Chrobak(1) found in 26,391 cases in the gynecological clinic of the Allgem. Krankenhaus in Vienna, from 1896 to 1900, seventy-two cases of displacement of the pregnant uterus; fifty-six of these were discovered by chance, *i.e.*, gave no symptoms, while sixteen cases presented more or less symptoms. In the 28,000 cases in the *obstetrical clinic* of this same hospital from 1894 to 1900, twenty-one cases of displacement were found; thirteen of these were also in the gynecological list, leaving eight actual cases with five which gave important symptoms of incarceration. This list then includes 54,391 cases with eighty cases of faulty position of the pregnant uterus, and twenty-one of these with signs of *incarceration*.

Chrobak has pointed out that retroflexions of the uterus are much more common than retroversions. In his list of twenty-one cases of incarceration, there are eighteen cases of retroflexions and three cases of retroversion.

Paul v. Kubinyi, (2) found in twenty-six years' experience, on the second Universität's Frauenclinic in Budapest, five cases of incarceration with marked symptoms. In three of these cases, reposition was found to be possible under anesthesia; in one case, abortion occurred after slight manipulation and in one case *gangrene of the bladder* occurred as the result of the incarceration.

The writer's personal experience based upon his material on the first gynecological clinic of the Bellevue Hospital

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* Read at the meeting of the Society of the Alumni of the Sloane Maternity Hospital, October 22, 1909.

Dispensary, the third division of the New York Lying-In Hospital, and his private practice, comprises a series of twenty-three cases of posterior displacement of the pregnant uterus.

In nine of these, there were marked symptoms of incarceration. Of these nine cases with symptoms, five cases aborted after ineffectual gentle efforts at reposition; three of these were found, later on, to have been held tightly in the posterior position by firm adhesions; in two cases the reposition was accomplished, but with unusual difficulty under anesthesia. In one case, (*q. v.* below) there was *great retention of urine* with *marked hemorrhage from the bladder.* In this group of twenty-three cases, retroflexion was much more commonly found than retroversion.

Etiology.—Pregnancy may start in a retrodisplaced uterus, or the latter may become so at any time during the first three to three and one-half months (rarely later) after conception has taken place.

A uterus which becomes retroverted or retroflexed *after* the onset of pregnancy becomes so from several causes: a fall; hard work; heavy lifting; coitus; implantation of the ovum upon the posterior wall of the fundus; carelessness in allowing the bladder to become repeatedly overfilled, where a slight displacement already exists; an acute salpingitis or salpingo-oophoritis occurring after conception; fibromyomata; a relaxed pelvic floor, etc.

Should the uterus then, from any one of the above causes, become retroverted or retroflexed, it will fail to rise properly above the promontory, as it enlarges, if it is held down by any sort of inflammatory condition, old or new; if it is held down from below or weighed down from above, by any newgrowth of the uterus or the ovary; if the promontory is abnormally conspicuous; if the cervix with the uterus retroverted becomes caught above the symphysis; if there is an abnormal hypertrophy of the bladder with gradual accumulation of residual urine (as in our own case); if for one reason or another the normal muscular tone, of the uterus and ligaments thereof, is lacking—as from under development, low general tone of the individual, etc.

MECHANISM OF SPONTANEOUS REPOSITION.

In the absence of any severe complications, the uterus will rise spontaneously in a large percentage of cases. Just what this percentage is, cannot be ascertained, as probably the majority of women are not universally examined during the early months of pregnancy. Replacement depends upon several factors, all of which doubtless play some part. In the first place, we would mention the "*intermittent contracting power*" of the uterine musculature. By this power of contraction the greatly overstretched anterior uterine wall, after a certain length of time, draws itself together—so to speak—and thus brings the fundus upward and forward. Under such circumstances this action may be furthered by the cervix pressing against the symphysis, as a fixed point. In the second place, we would mention the "power of sacculation" possessed by the growing uterus. This is seen most frequently in those cases in which the ovum is imbedded on *the anterior uterine wall*. The latter tends to bulge upward and forward more and more, so that in time the whole uterus—in the absence of other pelvic complication—will rise. This sacculation is repeatedly seen, in the presence of adhesions, which keep the fundus in the backward position. Even with existing adhesions, through this process, the whole uterus may gradually be drawn up out of the pelvis. Should the adhesions not yield, the patient will either abort or there will result the so-called *partial or incomplete incarceration*. Again, we must believe that the round ligaments play some part—in certain cases at least—in this process of spontaneous reposition. Developing, as they do, along with the uterine growth, there comes a time when they must exert some influence upon the uterus. This action, however, is bound absolutely to fail in those cases in which the uterus is badly retroverted with the cervix riding high above the symphysis. Finally, it is not unlikely that the utero-sacral ligaments aid somewhat in the process of replacement after the latter has once started.

We repeat, then, that given a *retroverted* or *retroflexed uterus free from adhesions, tumors, etc., reposition will take place before incarceration has occurred in the great percentage of cases, providing the obstacles to be overcome are not too great.*

Reposition is less apt to occur in those cases of bad posterior displacement associated with *prolapse of the uterus*. In these instances the general muscular and fascial tone of the pelvis is largely absent.

SYMPTOMS OF INCARCERATION.

These are, first, the usual symptoms of retrodisplacement, exaggerated by the pregnancy, viz.: Headache; pain in the back of the neck; backache; feeling of weight and dragging pains in the pelvis; irritability of the uterus; dragging sensation in the groins; pain along the sciatic nerves; increasing constipation; some irritability of the bladder (usually no pain at this stage); nausea and vomiting may or may not be present. With the increasing growth of the ovum and with it an ever increasing size of the uterus, there comes a time when, if the uterus fails properly to rise out of the pelvis, or is not replaced sufficiently early, more *pronounced symptoms supervene.* The entire picture is aggravated and we have before us the picture of incarceration, a picture alike dangerous to both mother and offspring. The time has come *when* the growing uterus, through its faulty position, and its incapacity to rise out of the pelvis, is going to produce severe—even deadly symptoms—from pressure upon certain important viscera, as bladder, urethra, ureters, certain ganglia of the pelvis, rectum, blood-vessels, etc.

The growing uterus has the power of exerting great pressure against the posterior vaginal fornix, as seen in the case of v. Haselberg where the posterior fornix was actually ruptured, allowing the uterine fundus to appear in the wound. Major and Grenser have reported similar cases (Samml Klinische Vortrage, Gyn., No. 192).

Unless the incarceration is relieved by a spontaneous abortion, or by artificial interference, the pain in the back and along the sciatic nerves becomes intense; the constipation may be accompanied by rectal bleeding; there is an ever-increasing difficulty in urination, and this is accompanied with ischuria, with finally, in certain cases, complete retention of urine. The ischuria is due to one or more of several causes, viz.: direct pressure on the urethra or the neck of the bladder;(3) disturbed circulation due to the pressure of the retrodisplaced fundus upon the sacral nerve-ganglia which supply the motor and sensory filaments to the base of the bladder.(4) According to Reed, second and third degree retroversions press earlier on the ganglia than retroflexions. The urine becomes first ammoniacal, then contains more or less pus and blood. The lower abdomen is either slightly painful and tender, or else becomes exquisitely so. There may be severe spontaneous bleeding from the bladder—sufficient to call for active treatment; there may be a sudden rupture, giving rise to collapse and peritonitis; there may be an actual gangrene of the bladder. To repeat, we note that *the essential symptoms of a true incarceration are referable to the bladder and not primarily to the uterus.*

The symptoms differ somewhat in the two varieties of posterior displacement.

Retroflexion of the Gravid Uterus.

(1) More frequent.

(2) Urinary difficulties appear early—by the twelfth week; Bad symptoms appear from the twelfth to the sixteenth week.

(3) Sacculation of the uterus not infrequent.

(4) In the absence of firm adhesions the uterus may right itself.

Retroversion of the Gravid Uterus.

(1) Infrequent.

(2) Urinary symptoms appear late—from the twelfth to the sixteenth week. Severe symptoms of incarceration appear from the sixteenth to the twentieth week. The first symptoms are due to pressure on the rectum.

(3) Sacculation rare.

(4) In first and second degree retroversion spontaneous reposition can take place; manual reposition possible. In third degree retroversion spontaneous reposition never occurs; manual reposition most difficult. (Chrobak)

Inasmuch, then, as the chief severe symptoms are referable to the bladder, I desire now to call your attention briefly to the four fundamental conditions that can arise, namely: (A) Retention of urine with severe idiopathic hemorrhage from the bladder. (B) Retention of urine with bloody urine, first appearing after catheterization. (C) Rupture of the bladder. (D) Gangrene of the bladder.

(A) *Severe Hemorrhage from the Bladder, with Accompanying Retention of Urine.*—Vesical hemorrhages are rarely profuse in the case of incarceration of the pregnant uterus. The small hemorrhages are usually to be found in ammoniacal urine, with more or less admixture of pus, and are, in these cases, rightly to be considered a symptom of approaching gangrene of the vesical mucosa. The etiology, however, of the cases with severe hemorrhage, is quite different. But few such cases have so far been reported.

The last true instances of this type are those of K. Baisch(5) and Ralph W. Lobenstine.

1. *Baisch's Case.*—About the fourth month the patient, a V-para, began to have some difficulty and some pain on urination. When voiding, she would help herself by pressure with the hands across the symphysis. There was an incarceration of the preg-

nant uterus. The urine, at the beginning of the difficulty, was clear; it, however, soon became bloody, and finally almost pure blood was passed. When the patient was seen at the clinic, the bladder was catheterized and a large amount of bloody urine removed. Under narcosis, the uterus was replaced. Convalescence was rapid. The urine rapidly lost its bloody character and became again clear. On the third day after reposition, the urine was clear enough to permit a thorough cystoscopic examination. There was no cystitis and no ulceration, but *the vessels, especially the veins, were everywhere markedly* dilated. There was also *considerable edema at the base of the bladder.*

2. *The Writer's Case.*—Mrs. A. M., age thirty, I-pàra, was admitted to my service at the New York Lying-In Hospital, November 8, 1908. The patient was about four and a half months pregnant. For two months she had been troubled with frequent urination; for two weeks the condition had become greatly aggravated. There was increasing difficulty in urination; there was pain over the badder, and for one week the urine had been dribbling away, more or less constantly. During this time, the urine had been markedly bloody in character. There was enough blood lost in this way to make the patient anemic and weak; the hemoglobin was 65 per cent. the pulse was 120.

On admission, the examination disclosed an enormously dilated bladder, with a large fluctuating tumor posterior to it. By catheter 47 ounces of foul smelling, turpid urine were removed. The latter part of the specimen was mixed with blood. The patient went into a moderate state of shock—evidently due to her weakened condition, as well as the removal of such a quantity of urine at one time. Examination, under narcosis, about three hours later disclosed a badly incarcerated pregnant uterus of about four and a half months.

The whole uterus seemed unduly cystic; the cervix was drawn up high above the symphysis. A thick, ill-defined mass, extending nearly to the navel, could be felt in front of the incarcerated uterus. The latter caused a very marked bulging and prolapse of the posterior vaginal fornix; this condition was so pronounced that, by widely separating the vaginal introitus, the tumefaction could be seen plainly. Reposition was absolutely impossible, even after a second catheterization. With the latter nothing but pure blood was obtained. A small abdominal incision was now made in the median line, above the pubis. The ill-defined mass we had felt above the pubis was an abnormally enlarged empty bladder whose walls were greatly thickened and traversed everywhere by large distended veins—some of which were varicosed. The bladder, as it lay empty, was about 4 1/2 inches wide and extended almost to the umbilicus. The omentum was partially adherent to it. With some difficulty the bladder was displaced, so as to allow the hand to be passed into the pelvis. The uterus was found to be tightly wedged in the pelvis, below a rather sharp promontory. After considerable effort—because of its unusual cystic character—it was replaced and held in place by vaginal tamponage.

The abdominal wound was closed, the bladder instilled with adrenalin solution and the patient put back to bed. She aborted on the third day after operation. Convalescence was troublesome because of a cystitis and pyelitis.

The urine under active treatment after reposition quickly lost all traces of blood, but continued to contain considerable pus for some time. Aside from the reposition, the patient was given large doses of urotropin and the bladder daily irrigated with hot boric acid solution.

These two cases present a rare condition—a condition in which the bleeding occurs, irrespective of catheterization and without gangrene of the bladder, and where the amount of blood lost is really considerable.

(B) *Severe Hemorrhage from the Bladder, first Appearing after Catheterization for Retention of Urine, due to an Incarcerated Uterus.* —Examples of this class are to be found in the cases of Ernst Holzbach,(6) Kroner, Reeb, Rasch, and Chambers.

CASE I.—Holzbach reports a case from the University-Frauenklinik in Tübingen.

The patient, a X-para, was forty-one years of age. She skipped her period at the end of February, 1908. At the beginning of June, she began to have trouble with micturition and defecation, which gradually became worse, so that she applied at the clinic for assistance the last of July. The bladder was enormously distended, and extended up to near the navel. The urine had been dribbling away—almost constantly—for eight days. The uterus was pregnant about five and a half months, with a considerable portion of the body of the uterus retroverted and held firmly below the promontory of the sacrum. The cervix was held far forward, pressing strongly against the neck of the bladder. A catheter withdrew about two liters of fairly clear urine, which was free from albumin and sugar. The same day 1,200 c.c. were again drawn off.

The case was diagnosed as one of "partially incarcerated pregnant uterus" with almost complete urinary obstruction. The patient was to be demonstrated at the clinic the following day, but early the next morning Holzbach was called to the patient who had just passed considerable *bloody urine;* with the catheter about one-half liter more urine with much admixture of blood was drawn.

After this there were two more slight hemorrhages from the bladder and then the urine became clear. Examination now showed that the partial incarceration had reduced itself spontaneously. The bladder could be felt much thickened, above the symphysis.

Twenty-four hours later, a cystoscopic examination was made.

There was no inflammation of the mucosa excepting slight catarrh of the trigone; there was considerable edema around the neck of the bladder wall; the veins stood out, greatly enlarged. At the top of the bladder there was evidence of a recent hemorrhage with several ecchymotic spots scattered here and there. Convalescence proceeded satisfactorily.

V. Fritsch states that in his forty years' experience, he has seen but one such case, despite the many cases he has catheterized with removal of all the urine. In the clinic in Tübingen, the present case is the only one of its kind, and it is noteworthy that the bleeding did not begin until several hours after the catheterization (twelve hours).

CASE II.—Kroner(7) describes a case of incarceration in which, after removing five liters of clear urine, owing to complete retention, such a severe hemorrhage ensued from the bladder that the patient collapsed. The patient died ten days later of pyemia. The bladder extended up to 10 cm. above the symphysis, and was adherent to the omentum. There was a small new-growth in the bladder. The uterus was replaced.

CASE III.—V. Reeb (8) presents a case which, after the withdrawal of 600 cc. of urine for retention, had such a severe hemorrhage into the bladder that the latter had to be tamponed from above. The uterus was not replaced.

The Cases IV and V, of Rasch and Chambers, (9) resembled closely the others of this series.

ETIOLOGY OF THESE SEVERE HEMORRHAGES.

This question has never been positively settled, so that it is but fair to present the chief theories advanced.

1. The hemorrhages that occur after catheterization are the result of a vacuum produced in the bladder by the removal of such large quantities of urine.

Dührsen believes that if the uterus can be replaced directly after catheterization, it will by its *normal position force the bladder's walls together*, and prevent the bleeding.

2. The view advanced by Baisch, v. Holzbach, and v. Fritch is that owing to the displacement of the bladder by the retroverted uterus, as well as from the pressure of the cervix against the blood-vessels at the base of the bladder, an extreme congestion of the venous blood soon ensues. Now, if the bladder be emptied without the disturbance in the circulation being remedied at the same time by the correction of the uterine displacement, when the internal pressure afforded by the urine in the bladder is removed, hemorrhage and edema must result. That the venous engorgement exists has been shown by the cystoscope: our case.

moreover, demonstrated the existence of an actual varicosed condition.

We note then that severe hemorrhages from the bladder may occur in the course of an incarceration of the pregnant uterus. Such hemorrhages may be sufficiently severe to cause marked constitutional symptoms. They depend chiefly upon a high degree of circulatory disturbances and may first occur, either before or after catheterization, for urinary retention.

(C) *Spontaneous Rupture of the Bladder—the Result of Incarceration of the Pregnant Uterus.*—Rupture of the bladder, as an accompaniment of incarceration of the pregnant uterus, was first described by Doeveren, in 1765. A few others have described the condition and reported cases thereof. Chief among these are John Lynn, Naumberg, E. Martin, Ahlfeld, and more recently A. Martin, of Rouen, whose case we cite in full as typifying this class. These ruptures occur usually on the posterior wall of the bladder and may or may not be the result of gangrene of the bladder wall. In the patient of A. Martin, there was no evidence of the latter. When not due to gangrene of the bladder wall, they are dependent upon localized degenerations in the musculature, or upon very great overdistention.

Dr. A. Martin's Case.(10)—On the fourteenth of January, 1909, Dr. Martin was called hurriedly by his associate Dr. Vallée to see a patient of the latter who was three months pregnant, and in a state of collapse.

The uterus was retroflexed and tightly wedged in the pelvis. The lower abdomen was somewhat distended and extremely tender. The pulse was rapid and feeble; her general appearance was very bad. The patient had been well up to within a few days, when she began to have some trouble with urination. Both Dr. Martin and Dr. Vallée decided that the patient probably had a ruptured bladder, the result of an incarcerated uterus. She was taken at once to the hospital, and a laparotomy performed after first catheterizing the patient. A large glassful of urine—blood-stained—was withdrawn. On opening the peritoneal cavity there escaped some two liters or more of urine. A tear 4–5 cm. was found in the upper portion of the posterior wall of the bladder. This was closed in two layers with catgut. The uterus was then with difficulty replaced by bimanual efforts. The vagina had to be thoroughly tamponed to hold the uterus in place. The abdominal incision was closed, excepting for a small drain at the lower angle.

A permanent catheter was introduced. The patient convalesced rapidly. The drain was removed on the fourth day, and the wound healed "*per primam.*" There was a mild pyelitis, but the patient was able to leave the hospital at the end of six weeks. Since then she has done well and at the time of writing (Dr. Martin, May, 1909) is about eight months pregnant.

(D) *Gangrene of the Bladder.*—Here again there has been much discussion concerning the etiology of this condition. The general theories are:

1. The *gangrene is due to a simple pressure necrosis.* This seems most unlikely, for in the severe cases there is gangrene of the entire mucosa with extensive exfoliation.

2. The theory of v. Schatz, Spencer Wells, Frankenhausen, Kinkenberg et cet., is that the *mucosa first separates at the summit of the bladder* and this is due to the fact that it cannot expand as rapidly as do the other layers of the bladder wall. Gangrene occurs, then, from loss of nutrition.

3. Pinard and Varnier maintain that the condition is the result of a gradual compression of the arteries at the base of the bladder.

4. The view that seems most plausible to me is the one advanced by v. Kubinyi and Wertheim. According to their belief, the gangrene is the result of *circulatory disturbances*, gradually brought about by the *ever-increasing pressure on the blood-vessels at the base of the bladder*, especially the *veins*. If this interference in circulation is maintained for some time, the resulting congestion causes edema and extensive submucous hemorrhages. Bacteria then gain ready access into the submucous spaces and gangrene sets in. The bacteria will usually gain access to the bladder without the intervention of catheterization.

The compression of the two main venous plexuses—the plexus venosus pudendalis and the plexus venosus vesico-vaginalis—is largely responsible for the stagnation in the blood stream. This stagnation is increased by the congestion in the uterine venous plexus due to the abnormal position of this organ.

The obstetric literature contains but comparatively few examples of extensive gangrene of the bladder due to incarceration of the pregnant uterus.

The case recently reported by Paul Kubinyi illustrates the severity of the condition.

The patient, Mrs. A. F., age twenty-two, primigravida, was brought to the clinic October 5, 1907. Four weeks before admission she had lifted several heavy bags of potatoes; two weeks later felt severe pains in lower abdomen and one week later had *dysuria*. This gradually grew worse so that finally she could only pass her urine while standing, and then only in small quantities. The urine during the last week contained some admixture of blood. Patient had several chills and fainting spells.

On admission she appeared very sick and in extreme pain. There was almost constant desire to empty the bladder. The lower abdomen was exceedingly tender and was dome-shaped, due to a greatly distended bladder. The external genitals were edematous. There was constant dribbling of a dark, foul-smelling urine. The posterior culdesac was pressed downward from above by a sharply retroflexed incarcerated uterus. The cervix pointed upward toward the upper border of the symphysis. The patient was given at once an anesthetic, and a catheter introduced. About five liters of dark, bloody, foul urine were withdrawn, containing some clots of blood.

After the emptying of the bladder the uterus was replaced, but only after much effort. To keep the uterus in place, a colpeurynter was introduced in the greatly dilated posterior fornix.

For the next two days the patient suffered intensely; the pulse was 120–130; the temperature around 37.6. The bladder was gently irrigated daily with a weak potassium permanganate solution.

Cystoscopic examinations were made after the third day. Diagnosis was made of gangrene of the mucosa of the bladder. Patient was now able to urinate, but there remained residual urine up to 60–70 cm. The temperature was subnormal.

Two days later, patient aborted of a four months fetus. Her condition was grave. On the thirteenth day after admission, the patient suddenly discharged from the bladder, under severe tenesmus, *the entire necrotic mucosa.* This was followed by moderate bleeding and a ten minute duration chill. She, however, soon began to improve rapidly, so that she was able to leave her bed five days later. She was able within three weeks to retain her urine during the day, but not during the night. Daily irrigations were used. By November 24, patient seemed almost well. The uterus, which was again retroflexed, was replaced and a pessary introduced. There were no adhesions.

From the examination of the ejected mucosa, it was decided that the superficial layer of the muscularis was also involved with it.

Treatment before Active Symptoms of Incarceration.—Considering the large number of abortions directly due to a retrodisplacement or more correctly to the accompanying endometritis, it behooves us to examine every case of pregnancy as soon as possible, and to ascertain the position and mobility of the uterus as well as the condition of the other pelvic viscera. A simple uncomplicated retrodisplacement will usually rectify itself if an abortion does not occur. However, as abortions more often take place in a faulty position of the uterus, and as many neurotic women suffer as a result of even a noncomplicated retrodisplacement, the writer now believes that the early use of a pessary is the safest course to pursue. Cases with adhesions or other pelvic complications demand their appropriate treatment by means of tampons carefully employed; by colpeurynter; by posterior vaginal section, or by laparotomy.

Treatment after the Development of Symptoms of Incarceration.—The patient should be catheterized. If there is a large accumulation of urine, the complete emptying of the bladder should be carried out in two sittings. Suprapubic puncture is rarely necessary. An attempt should then be made to replace the uterus. The writer believes, as a rule, excepting perhaps in a very thin subject or in the presence of any real objection, anesthesia should be employed. This makes the success of the reposition far more likely, and makes the patient much less liable to abort, as the manipulations for replacement can be the more readily carried out.

If reposition can be accomplished, a large ring should be introduced and the patient kept in bed, on one side, for at least one week. The knee-chest position should be employed and the pessary worn until all danger of a return of the condition is passed.

If, however, reposition fails, two courses are open to us. We may make a posterior vaginal section and replace, after breaking up any adhesions if these exist; or we may perform a laparotomy. By the latter method, the uterus is the more readily brought up out of the pelvis and any existing complications can be thoroughly dealt with. A properly fitting pessary should be introduced at once or tampons temporarily employed and full doses of opiates administered for the first few days thereafter.

A third method, but one that should be relegated to the background, excepting in cases of "active abortion" or "incomplete abortion," is the "*emptying of the uterus*" when active symptoms supervene in the course of an incarcerated pregnant uterus.

Even this procedure may at times be most difficult to accomplish. It has then been advised to empty the uterine cavity by direct puncture of the retroplaced fundus through Douglas' culdesac. Such an operation is extremely hazardous and *should, we believe, be condemned.* In case one should meet with such a condition, *i.e.*, a condition in which the uterus must be emptied, but cannot be in the ordinary way, *a far better plan* than the hazardous opening through the culdesac would be to *enter* the uterine cavity through a posterior vaginal hysterotomy wound.

The extreme degrees of complications require, in addition to the general treatment outlined above, individual attention, according to their several needs. A rupture of the bladder calls for an *immediate* laparotomy. The cases with severe hemorrhage from the bladder require, in addition to the reposition, hot irrigations with or without adrenalin. Gangrene—either localized or general—of the bladder demands urinary antiseptics, bladder irrigations, and possibly vesical drainage through a temporary vesico-vaginal fistula. All septic manifestations must be intelligently and actively dealt with.

Mortality.—Exact statistics are lacking. We may, however, form some judgment of the possible serious consequences of incarceration of the pregnant uterus by studying the mortality statistics collected by I. ten Berge.(11) This list comprises seventy-three deaths, directly dependent upon the bladder conditions. The causes of death were:

Uremia,	16 cases
Septicemia through bladder gangrene,	14 cases
Peritonitis,	40 cases
Pyemia,	3 cases

While the deaths *not* primarily due to the bladder gangrene were:

Peritonitis from intestines,	4 cases
Laceration of peritoneum and vagina,	2 cases
Operative failures,	3 cases
Unknown causes,	5 cases

Chrobak.

Only three deaths directly due to *primary uterine infection* have been reported, viz., by Traub, Gottschalk, and Heymanns.

In closing I would accentuate the fact that, while retro displacements of the pregnant uterus will, as a rule, correct themselves, when no other pelvic complication exists, still reposition *may not* occur spontaneously; severe symptoms may set in, and the life of both mother and off-spring be endangered. The condition therefore should not be considered too lightly, nor should it be treated with too great conservatism.

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67 EAST FIFTY-FIFTH STREET.

SOME SEQUELÆ OF PRESENT-DAY LABOR.*

BY
JOHN OSBORN POLAK, M. Sc., M. D.,
Brooklyn, N. Y.

THE conduct of labor by the expert has been greatly improved in the last two decades, but obstetrics as practised by the rank and file of the profession is little better now than that of twenty years ago. The advent and development of asepsis and antisepsis has given the ignorant and conscienceless more courage to interfere in the course of labor without a proper appreciation of the indication for such intervention, so that while the maternal mortality has been reduced, the morbidity has been increased, and the woman is left with sequelæ which are sometimes beyond the power of medicine, surgery, or hygiene to correct.

Much of this mutilation of the passages, for such it is, could be avoided, did the practitioner have a better appreciation of the relative size of the fetus and the pelvis before resorting to frequent and unwarranted interference with the forceps or unjustifiable versions. The soft parts of the birth canal cannot be dilated artificially without injury: it makes no difference whether we use the hand, a hydrostatic bag, or a steel dilator, some cervical injury will always result.

Artificial rupture of the membranes before dilatation is complete, to hurry labor and increase the pains, is bad practice, and is fraught with the danger of cervical lacerations, which open avenues for infection. For years the practitioner's conception of obstetrics has been to get the child out at any cost, often leaving the woman maimed and the child injured. This is hardly what should be looked for in twentieth-century practice. Some few of the sequelæ which an untimely interference may produce and which leave our patients in a state of more or less invalidism are: *lacerations of the pelvic soft parts.*

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* Read at the meeting of the Society of the Alumni of the Sloane Maternity Hospital, October 22, 1909.

Injuries to the cervix are very frequent. All forms of artificial dilatation result in tears of some degree. This statement may seem exaggerated, but its correctness can be proved if we will but look at our work. All forceps applications through the cervix before it has been pulled up over the presenting part are attended with laceration. Dry labor predisposes to it; manual, bag, and instrumental dilatation produce it.

Injury to the cervix favors general infection, uterine phlebitis, parametritis, subinvolution, displacement of the uterus, and a limitation of the mobility of the uterus by the production of scar tissue in the vaginal fornices. A small amount of infection becomes prominent in traumatized tissues, which act as a nidus for its development. Not only is it a fact that laceration of the cervix is produced in a large proportion of present-day labors, but the tears are passed over, and neither treated nor sewn until they have had their effect on the involution of the uterus, and subinvolution is a common starting-point in acquired gynecological disease. Subinvolution is most often due to lacerations of the cervix or of the pelvic floor, mild infections or retained portions of the secundines, in conjunction with too early rising from bed and resumption of household duties, retroversion and retroflexion soon follow, and with these come the whole train of pelvic symptoms, the recital of which is so familiar to us all.

Acquired retrodeviations of the uterus after labor are comparatively common. In a study of 500 consecutive labors in private practice, in which the women were examined on the tenth day of the puerperium, retroversion was found only forty-three times; but on examination of these same women between the fourth and sixth week after delivery, the uterus was found to be displaced backward in two hundred and thirty-one (231). Two hundred and three (203) of these uteri were movable, and could be readily reposited, and were retained in a normal position with a properly fitted pessary until their uterine supports had regained the proper degree of retraction. Only twenty-eight could not be retained in position with a pessary, and were discharged with retroverted uteri.

These facts to me are convincing that the responsibility for a large proportion of retrodisplacements of the uterus rests with the attendant. Since making these observations I have modified my methods of postpartal treatment, some of the details of which will be noted later.

Metrorrhagia during the puerperium almost invariably indicates a disturbance in the involution of the uterus, retained products of conception, or the presence of a retrodeviation. It would seem, therefore, that proper interrogation of the character of the lochia will give timely warning of any abnormality and suggest the desirability of careful investigation. Many of my cases of femoral phlebitis have had a metrorrhagia, which has persisted for many days, before the extension of the thrombus which has blocked the circulation of the involved limb. This we find has been due to a left uterophlebitis, which passed at first unrecognized, until the femoral trouble was already developed.

The normal involution of the uterus takes from four to twelve weeks, and during this time the possibility of retrodisplacement, uterophlebitis, and exudative inflammatory changes in the pelvis is always present. This is particularly true in postabortal cases, the after-care of which is even more lax than that of the puerperium at term.

We fully appreciate the difficulty of giving proper attendance to the tenement poor, where the mother is not only the producer, but oftentimes the wage earner, and the physician and proper medical attention a luxury; yet these are the patients who come to our clinics for treatment, and get free what their more fortunate sisters pay for, but do not receive.

Why is this so? First, because many physicians believe that to acknowledge that an injury has taken place in the soft parts during their conduct of a labor is an admission of their lack of skill: thus many injuries passed unobserved and go unrepaired; and, secondly, because the indications for each of the several obstetric procedures are not clear in the mind of the practitioner, and he tries one and then another method of delivery, either before conditions justify interference or until the child is pulled out, dead or alive, and the woman too worn out, and the parts so traumatized after a hard labor that immediate repair is out of the question. This together with varying degrees of sepsis and much negligence during the puerperium as to detail, furnish us with our gynecology.

The avoidance of traumatisms and lacerations during labor, the prevention of infection, however slight, the complete evacuation of the uterus, and the maintenance of its firm reaction by the generous use of ergot or some of its derivatives until involution is complete and the uterus regains and retains its normal relations in the pelvis, should be our aim in the conduct of a labor case. The first is accomplished by the thorough dilatation of the passages. In primipara we have found that the use of the colpeurynteur in the vagina will do this. It not only preserves the membranes, by offering to the advancing bag of waters an equivalent hydrostatic pressure from below, thus securing the fullest dilatation of the os and obliteration of the vaginal portion of the cervix, but it prepares the vagina, and the vulvo-vaginal orifice for the passage of the head. Objection has been raised to its general use, in that it may displace the presenting part and disturb the posture, and, second, that it opens another avenue for the introduction of infection. Both of these contentions we have disproved by practical demonstration. A short Champetier bag is the one of choice, as its shape fits the curve of the vagina and its circumference is practically that of suboccipito-bregmatic of the fetal head. The vulvo-vaginal orifice is thus dilated sufficiently to permit the passage of the head with a minimum trauma to the soft parts. When care and time is given to the introduction and inflation of this bag, but little pain is produced, and the labor pains promptly assume an expulsive character.

Lacerations when they occur should be sewn. An operation deferred for forty-eight hours after delivery gives the best results; for at this time the edema and swelling have somewhat subsided and proper coaptation of the severed structures may be made without too great constriction of the tissues. We discourage immediate suture of the cervix, except for hemorrhage, as at this time the lower uterine segment and cervix is flaccid and unformed. In forty-eight hours, however, satisfactory results may be gained, for the extent of the injury may be recognized and proper approximation made.

Anesthesia and proper assistance, especially if the injury be extensive, are imperative. Sterile chromic catgut may be used in the cervix and in the anterior vaginal wall, but my best results in the pelvic floor, have been obtained with silkworm-gut and silver wire.

The methods employed for the prevention of sepsis are too well known to you all for me to take up your time with their recital, though I would strongly suggest infrequent vaginal examinations and the use of sterile rubber gloves in the conduct of every labor. One careful examination at the beginning of labor should suffice; this may be made under anesthesia if there is difficulty in making the diagnosis. An empty uterus favors prompt retraction. This is primarily obtained by the proper conduct of the third stage, to which in the absence of bleeding sufficient time should be given to permit of the complete separation of the placenta and its membranes, the expulsion of the after-birth, and the firm retraction of the uterus.

When pieces of the placenta, membranes, or large blood clots are retained, their digital removal may be attempted after the vulvo-vaginal orifice has been rendered sterile. Large doses of ergot are then given, and its administration continued throughout the puerperium in the form of the postpartum pill.

Proper postural treatment secures good drainage, the patient is urged to change her position frequently, assuming the right and left latero-prone postures, lying upon her abdomen, and encouraged to sit up in bed to eat her meals and nurse her baby, and out of bed to void and evacuate her bowels. The elevated trunk posture is used in all patients with any pelvic infection, as it empties the vagina of clots, and localizes the pelvic inflammation.

When the involution has progressed to such an extent that the fundus uteri is on the level of, or below the pelvic brim, the patient is allowed to sit out of bed. Before returning to bed and resuming the recumbent position, the woman is placed in the knee-chest posture for several minutes. Hot sterile vaginal douches are begun when the lochia becomes alba. Frequently some slight bleeding occurs immediately following a hot douche, but this ceases as good retraction takes place. These douches should be quantitative, 116 to 120° F., one or two gallons being used at each sitting.

As referred to above, displacements of the uterus occur in a large proportion of patients during the later weeks of the puerperium after the uterus falls below the brim. These dislocations of the puerperal uterus usually manifest themselves by hemorrhage of varying degree. Inversion, prolapse, forward and backward deviations are likely to be associated with a profuse bloody lochia or may even be followed by active hemorrhage.

The hemorrhage in these displacements is a result of passive congestion, due to the interference with the venous circulation, or due to the retention of blood within the uteine cavity, which results from the mechanical interference with its escape therefrom. Clots form and are retained and increase in size because the retraction is arrested. These clots may undergo putrefaction, and thus prevent complete uterine retraction; this not only attracts more blood to the uterus by their irritating action as foreign bodies, but acts as a nidus for infection, which infection may extend to the thrombi in the placental site, disintegrating them, and causing sudden hemorrhage or a thrombotic extension to the uterine veins.

The chief causes of prolapse and backward displacements are the increased weight of the puerperal uterus, due to lacerations, the lack of proper support from the pelvic floor, the loss of tonicity, and a relaxation of the uterine ligaments consequent upon the overstretching of pregnancy, associated with a varying degree of subinvolution, which may be precipitated by some physical effort of the patient on getting out of bed, as forced defecation in the presence of full bladder which has pushed the fundus backward, or the faulty application of the abdominal binder, waist bands, or corsets, increasing the intraabdominal pressure within the pelvis, and, further, retroversion and retroflexion may persist after abortion if these displacements existed during the pregnancy.

After pulling down the uterus to empty it with the finger, curette, or forceps, we always make a special effort to reposit it high in the pelvis, in a position of normal anteflexion, and to try to maintain it in such position with a vaginal support of gauze before concluding the operation. This not only secures better drainage for the loosened detritis still within the uterus, but relieves the stretched uterine ligaments of tension, and thus stimulates them to retraction.

It should be an invariable rule to make a digital exploration of the pelvis in every case of puerperal hemorrhage. For metrorrhagia occurring after the lochia rubrum has ceased or the continuance of a bloody lochia is always pathologic. It is not unusual to find portions of ovum or clots retained after abortions and premature deliveries, in anteflexions and retroflexions, in consequence of a stenosis by angulation of the cervical canal.

Chorio-epithelioma, subinvolution, and submucous polyps should be recognized and differentiated at this examination and credited with their full significance in the production of hemorrhage. When the hemorrhage is due to backward or forward displacements, the treatment is to straighten out the uterine canal by the correction of the displacement, and thus secure better drainage for the uterus. This may be done by digital manipulation alone, or by the bimanual, or by the patient assuming the knee-chest position, or by the two combined; when the uterus has been reposited, the organ is retained in its proper relations by a sterile or iodoform gauze tamponade in the vagina, introduced with the patient in the genu-pectoral or Sims position. On withdrawing the vaginal pack, the uterus will be pulled down, and has a tendency to relapse into its malposition, unless the removal is done with the patient in the knee-chest posture. It is therefore our custom to treat these patients every second day in the knee-chest position; repositing the uterus by grasping the cervix with a volsellum, by which the cervix is pushed well upward and backward toward the sacrum, while sterile wool tampons, moistened with boroglyceride, are placed in front, below, and to the sides of the cervix. The vagina is cleansed before each treatment with a weak lysol or creolin solution. A pessary is contraindicated, as a rule, before the sixth week, as the tissues are sensitive and open to ulceration because of the disturbed circulation. After this treatment a suitable pessary is fitted and worn for several months.

When the hemorrhage is due to dislodgment or disintegration of clots at the placental site, an intrauterine tamponade of iodoform gauze is the procedure which stimulates contractions by irritation, besides acting as a tampon to control the hemorrhage, which may often be sudden and profuse.

Puerperal cystitis is another complication which I have met with in consultation practice. This condition is largely due to the absolute neglect on the part of the practitioner of the bladder during labor. How many of us see that the bladder and rectum are emptied, as a routine procedure, before the forceps is applied or a version done?

The traumatism to the neck of the bladder during normal labor and the consequent swelling of the urethra, together with the sudden diminution in the intraabdominal pressure after delivery, favors retention of urine and overdistention of the bladder during the first puerperal day. Add to this the pro longed pressure which the head just entering the brim makes upon a full bladder, and the dragging down of that viscus between the head and the pubes in a difficult forceps before the cervix is so completely canalized as to pass over the advancing head, and we have a condition of the vesical tissues so reduced in resistance by trauma and laceration that infection of any sort, mild though it may be, will produce serious consequences. I have seen a cast of the entire mucous membrane of the bladder passed following such neglect.

Vesical complications may be avoided by not operating, except in the presence of an empty bladder, a fully dilated or dilatable cervix, and by observing the proper axis traction in forceps delivery, which will permit the bladder to slip up out of harm with the recession of the anterior lip. Prompt emptying of the bladder after labor, allowing the patient to sit up to evacuate it, tends to reestablish its function.

In event of the patient being unable to void within twelve hours after the labor, sterile catheterization may be done. Strychnine and some urinary antiseptic, as urotropin, will materially improve the muscular tone of the bladder and minimize the chances of infection in event of continued catheterization.

Vesico-vaginal fistulæ, from pressure necrosis following labor, fortunately occur with less frequency than in the early days of my experience; this I believe to be due to the more general use of the forceps. On the other hand, recto-vaginal perforations are more common, due to injury with the tips of the forceps, resulting from faulty traction and attempts at forcible rotation of the head with the instruments.

Traumatic separation of the pubic joint is another complication which has been noted several times in the last few years. In four of the cases seen by the reader, the injury was produced by attempting to rock a head through the pelvis with the forceps. All of the children were easily delivered following this spontaneous symphysiotomy.

It is interesting to note that the attendants of these patients congratulated themselves on their skillful use of the instruments, in delivering a living child in spite of a relative pelvic contraction which had seemed insurmountable, when it was only recognized after the instruments had been applied.

Intense pain and tenderness over the pubic joint and an inability to move the limbs without exquisitive suffering were the symptoms complained of in these separations.

Fixation of the symphysis with a wide zinc oxide adhesive bandage which encircled the pelvis, together with the rest in "a trough bed" for from three to six weeks, resulted in a united but not altogether painless joint.

Aside from injuries to the pelvic soft parts and misplacements of the uterus, the pelvic changes which result from interpartum and postpartum infections, make up the largest part of our gynecology.

The changes produced by a septic metritis in the uterine musculature leave the organ denser and permanently enlarged. A pelvic cellulitis in one broad ligament results in a permanent shortening of that ligament and fixity of the uterus on that side, displacing the cervix and body laterally.

A pelvic peritonitis with its resulting pelvic abscess shortens and fixes the uterosacral ligaments, limiting the subsequent mobility of the uterus or drawing it backward in the pelvis, besides leaving the tubes and ovaries in a more or less maimed condition from adhesions and displacements, even if active infection has not destroyed their functions. It would seem, therefore, that the physician who practises obstetrics to-day has much to learn in order to bring his art to the perfection which its importance warrants, and this can only be accomplished by a better appreciation of the indications for interference in the presence of pelvic contraction or relative contraction, the observance of proper surgical skill and judgment, the prevention of infection, and the repair of injuries, and finally by the attention to detail during the puerperium which will prevent or correct the many trifling gynecological disorders which take their origin at this period.

287 Clinton Avenue.

THE CHLOROFORM PACKAGE FOR THE OBSTETRICAL BAG.

BY

F. HOEFFER McMECHAN, M. D.,

Anesthetist to St. Mary's Hospital,
Cincinnati, O.

(With three illustrations.)*

For a considerable length of time it has been the endeavor of purveyors of chloroform to market this potent anesthetic in a container, which would not only preserve the drug in its original chemical purity, but would also serve the added purpose of acting as a drop-bottle for the induction and maintenance of narcosis. This problem has been finally settled by the invention of the *Dropper-ampoule.*

Previously, several foreign and American marketers of chloroform had dispensed it for certain trades in sealed ampoules, from which it was poured into mechanical droppers of various makes at the time of use. However, the new invention dispenses with valves and levers, and by its utter simplicity, economy, convenience, and safety promises to become the package of choice in both the emergency and obstetrical bag.

In following closely the current literature on anesthesia, both in American and foreign journals, it is obvious that the trend of the profession is toward a greater care in the selection of anesthetic drugs for certain classes of cases and much more attention to the details of administration. This tendency can only result in the saving of many patients who heretofore have perished through lack of skill or judgment on the part of either the anesthetist or operator.

While chloroform has a lower percentage of safety than any other anesthetic in popular use at present, it is due to the fact that this most potent of anesthetic drugs has always been given in too large a quantity or too cold and concentrated a vapor. Gwathmey's experiments, laboratory and clinical, with the warmed vapors of ether and chloroform have established the fundamental principles of safe narcosis. Summarized, these principles are the induction and maintenance of narcosis with the lowest percentage and amount of warmed chloroform or ether vapor which will singly or in combination accomplish anesthesia of the required depth without any untoward symptoms on the part of the respiratory or circulatory system.

The Gwathmey vapor apparatus is without doubt one of the most remarkable and progressive inventions in the history of anesthesia, but it is an impossible adjunct in the emergency or obstetrical bag. It is primarily an apparatus for the hospital and the expert anesthetist.

Lacking absolutely any mechanical details whatever, the *Dropper-ampoule* in use approaches very closely the accuracy and percentage strengths of the vapor-method of inducing and maintaining chloroform narcosis.

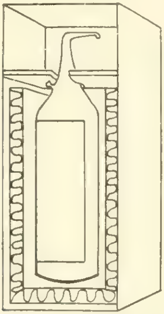

Fig. 1.—Showing method of packing to prevent breakage.

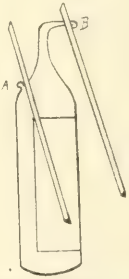

Fig. 2.—Method of filing tips previous to breaking them off.

The *Dropper-ampoule* is a cylindrical glass container, one end of which is elongated to a narrower caliber and terminates in a bead-sealed capillary tip. On the shoulder of this container is a second capillary projection, similarly sealed. The ampoule has a capacity of thirty grams, an amount of chloroform seldom exceeded with this dropper in the ordinary run of narcoses for single operations or obstetrical procedures. The *Dropper-ampoule* is marketed in strong card-board boxes, fully protected from breakage, thus making it *the* package of chloroform for the emergency or obstetrical bag.

To use the *Dropper-ampoule* it is only necessary to break off the bead-like tips of both capillary endings. This is accomplished by previously nicking the tips with a slender file provided in the package or by snipping them off with a scissors. The point is to preserve the capillary ending as long as possible.

This insures a minimal drop of chloroform, upon which the economy, safety and convenience of the *Dropper-ampoule* depends. The frequency of the drop is regulated by the angle at which the ampoule is tilted.

Reverting to the minimal drop, most mechanical droppers have the calibers of both their air-inlets and drop-points entirely too large, thus giving an oversupply of the anesthetic with each drop. The minimal-sized drop of the *Dropper-ampoule* results in the delivery of the smallest amount of chloroform with each drop, which in turn results in a consequent quicker vaporization of the anesthetic, a lessened wetting of the gauze on the mask, and an increased capacity on the part of the nasal and oral passages to heat the vapor once it has been produced.

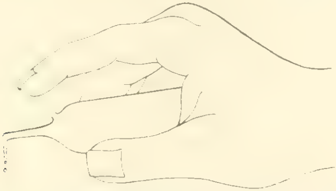

FIG. 3.—Regulating the frequency of the drop by the angle at which the ampoule is held.

Comparing the drip of various mechanical droppers and the *Dropper-ampoule*, it has been found that the former average as low as from eighty to one hundred drops to the fluidram. With a standard pipette chloroform should drip one hundred and eighty drops to the fluidram. The *Dropper-ampoule* averages two hundred drops and over to the fluidram. The unvarying size of the drop and its minimal proportion are decided safeguards in the preliminary stages of chloroform narcosis. In short narcoses the amount of anesthetic consumed by the *Dropper-ampoule* is surprisingly small, and in longer and more tedious operations it is astonishing with how little of the anesthetic a proper depth of narcosis may be maintained.

While the profession at large is not inclined to dread the administration of anesthetics during obstetrical procedures, those authorities who have had the most experience with the worst cases are all inclined to use narcosis with proper temerity and all attention to the selection of the proper anesthetic and its technic of administration. The incautious are usually the ones who are tripped up by unexpected and unnecessary deaths during such obstetrical deliveries as require narcosis for their accomplishment.

Among the reasons assigned for the comparative freedom from accident of chloroform anesthesia during labor are these: that the element of fear of the anesthetic is displaced by the woman's suffering and her desire for relief; that physiological hypertrophy of the heart protects against circulatory failure; that the deeper respirations and expulsive efforts prevent asphyxial difficulties and promote the pulmonary circulation and the emptying of the right heart; that high abdominal pressure prevents vasomotor dilatation. (Patton.)

While the pregnant woman will stand considerable over dosage with chloroform during delivery, this is no reason or excuse why chloroform should be administered obstetrically in any quantity greater than that which is absolutely required to relieve the pains or to induce and maintain narcosis of a satisfactory depth. Saturation with chloroform has been responsible in the past for many close calls for the mother and not a few asphyxiated babies. When the anesthetic is delivered on several thicknesses of gauze in minimal drops from the *Dropper-ampoule*, both mother and child have the greatest percentage of safety in their favor.

Surgeons and obstetricians who have witnessed anesthesias conducted by the use of the *Dropper-ampoule* during their operations have been invariably surprised by the minimal amount of chloroform consumed.

Peculiar as it may seem, the use of a minimal drop enables the anesthetist to narcotize the patient with more rapidity and less inconvenience than when a larger drop is utilized. In fact, all the dangers in chloroform narcosis may be summed up in the one word "*Crowding!*" The minimal drop results also in an obliteration of the stage of excitement, which is, after all, simply a reflex revolt of the respiratory and circulatory systems against a too rapid or too sudden a profound narcosis. Also the lessened quantity of the drug utilized results in a consequent infrequency of postoperative nausea and vomiting.

The angle at which the *Dropper-ampoule* is held regulates accurately the frequency of the drip, and this regulation on the part of the anesthetist and the minimal drop automatically supplied insure an easy induction and an extremely placid maintenance of anesthesia.

Preceded by a few drops of some favorite perfume, the advent of the chloroform on the mask is scarcely perceptible, and if the narcosis is followed by the free use of soap and water to remove the cold cream about the nose and lips and the inhalation of vinegar, cologne, or toilet water and a free airing of the room, there will remain little or no recollection of even the odor of the drug, which is a potent factor in inducing nausea.

In its simplicity of construction and preparation for use; its economy in the amount of anesthetic consumed; its convenience as compared with other complicated apparatus and its safety due to the minimal drop, with rapid vaporization and heating in the oral and nasal passages, the *Dropper-ampoules* has brought the *Drop-method* of chloroform narcosis to the point of perfection.

The *Dropper-ampoule* is worthy of trial by obstetricians who use chloroform narcosis for the accomplishment of relief from pains and the conduct of instrumental deliveries. It is the handiest, safest, most economical, and simplest package of chloroform so far devised for the obstetrical or emergency bag.

639 West Seventh Street.

TRANSACTIONS OF THE ALUMNI SOCIETY OF THE SLOANE MATERNITY HOSPITAL, NEW YORK CITY.

Meeting of October 22, 1909.

The President, Oliver P. Humpstone, M. D., *in the Chair.*

The proceedings were opened by Dr. De Forest, who presented the history of a case of

THRUSH IN AN INFANT ENDING FATALLY.*

Dr. G. I. Broadhead then reported a case of

SPONTANEOUS RUPTURE OF THE UTERUS DURING LABOR.

The patient, Mrs. B., was a primipara, age thirty-seven, who came into the service at the New York Post-Graduate Hospital, on April 6, 1909, about two weeks prior to the expected date of confinement. She had had four normal labors, which were in fact described as precipitate. The last child was born in March, 1907. In May, 1908, the woman miscarried at three months and one week later was curetted, making a good recovery.

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* To appear in the January issue of this Journal.

The date of her last menstruation was given as July 15, 1908. The history of the present pregnancy was uneventful, the fundus was at the eighth month, position of the fetus, R. S. P., fetal heart sounds not heard. The pelvic measurements were large —spines, 26 cm., crests, 30 cm., obliques, 23 cm., and external conjugate, 21.5 cm. The vaginal examination showed nothing abnormal. Labor began May 22, at 10.30 A. M. At 2.45 P. M. a member of the house-staff reached the woman's residence. She was having severe pains every two or three minutes but there had been no bleeding. Upon examination, however, a few clots were found in the vagina, the cervix was soft and admitted three fingers, the membranes were intact, the vertex was just beginning to engage in the brim. There was a suspicion of placenta previa lateralis. Pulse, 105; temperature, 99° F. The patient's general condition was good, but she complained that the pains were more severe then in any previous labor. At 3.30 P. M. the woman had a very severe pain in the left side of the abdomen, which began below and extended upward and was accompanied by the remark "that she believed the child was born." The labor pains ceased at once, the woman felt weak and continued to complain of constant severe pain in the left lower quadrant of the abdomen and extending across above the umbilicus. She also started to vomit and continued to do so at half hour intervals. Vaginal examination showed no change in the position of the vertex, but there was considerable, although not alarming, hemorrhage. At 3.40 P. M. the pulse was 130, at 4.10 P. M., 140. The abdomen became very tender, the pain severe and constant. The visible loss of blood up to this time was not above ten ounces. The patient was then transferred, to the hospital, and on admission the temperature was 101.2° F., pulse 148, respiration 38, the abdomen was exquisitely tender, especially above the navel, and the uterus, though tense, was of normal size. The patient seemed in great distress, complaining constantly of severe abdominal pain. A diagnosis of concealed accidental hemorrhage was made and immediate delivery seemed indicated. Vaginal examination showed an L. O. P. position, the vertex dipping into the brim, cervix about three fingers dilated and very soft. The cord was found pulseless and craniotomy was at once performed. The fetus weighed about five pounds after delivery and was readily extracted. When the head was brought down into the pelvis, a small rim of the cervix could still be felt, but with easy tractions the dilation became apparently complete. In reality the rupture of the uterus was extending downward through the cervix. As the pulse was 142 and thready, an intravenous infusion of 1,000 c.c. was given. There was little bleeding during or after the operation, and the uterus appeared to be well contracted with the fundus just above the symphysis. Several ineffectual attempts were made to express the placenta by Credé, and finally the hand had to be introduced and a manual extraction done. At this time the rupture of the uterus was discovered; and, as the laceration was extensive, immediate preparations were made for laparotomy. The abdomen was opened by a median incision and a small amount of free blood found in the cavity. There was a complete rupture five inches in length on the left side, running from the attachment of the left round ligament downward through the cervix. As the tear was not ragged, the uterus was closed with two tiers of interrupted chromic gut sutures (No. 2), avoiding the mucosa, and a continuous suture of plain gut was passed through the serous covering. The amount of blood lost during the labor and operation did not exceed twenty ounces. The abdominal incision was closed in the usual manner and the patient was returned to the ward in very good condition—pulse 120, respiration 26, temperature 99.4° F. For a period of thirteen days following the operation, the temperature varied between 100° and 103° and the pulse between 100 and 120, although the incision healed perfectly. After the operation there was considerable abdominal pain which became very severe about the eighth day and became localized on the right side midway between the anterior superior iliac spines and the free ribs, where a hard mass could be palpated about the size of a large orange, movable, tender, but not markedly so, with a flat percussion note. The blood count was as follows: on the fifth day, leukocytes 4,300, polynuclears 75 per cent.; on the seventh day, leukocytes 7,600, polynuclears 81 per cent.; on the tenth day, leukocytes 10,000, polynuclears 85 per cent. After the eighth day there was some nausea and vomiting. On the thirteenth day an incision was made directly over the mass and the omentum, which formed the median and anterior wall, was separated by blunt dissection, whereupon nearly a pint of foul, greenish pus with a considerable number of dark leathery blood clots was evacuated. The cavity was drained and the wound partially closed by suture. The recovery was uneventful and the patient was discharged from the hospital three weeks later. At the present time the woman feels very well, the menstruation is regular, but a small sinus persists in the abdominal wound. The points of interest in this case are that 1. all the previous labors were easy; 2. there was no predisposing cause for rupture such as a uterine cicatrix; and 3. the only operation the patient had ever had was the curettage one year before the time of rupture; 4. the rupture occurred after a very short labor in which there was no obstruction to the delivery of a small child. That the uterine wall was weakened on the left side is evident, and it is possible that the curettage may have been responsible. It is the first and only case of spontaneous rupture without predisposing cause, which has come under my observation and it therefore seemed to me to be worthy of record and of discussion by this society.

DR. F. A. OASTLER desired to present a case of rupture of the uterus in connection with that previously reported. It was not spontaneous, but yet interesting from several points of view. The history was briefly as follows: The woman was thirty-two years of age and in her second pregnancy. A midwife had made the effort to deliver her of twins. She succeeded in getting out the first child, but the second was a transverse presentation, which she could not deliver, and called in two physicians. The latter eventually delivered the woman, but whether the child was dead or alive, the doctor did not ascertain. However, she was sent to the hospital with the diagnosis of a badly lacerated perineum. She arrived in shock and in very poor general condition. Examination showed a large opening back of and to the left of the uterus, and the pelvis was filled with blood clots. The patient was immediately placed on the operating table, and the uterus removed through an abdominal laparotomy. Infusions and other methods of stimulation were employed, and fortunately the woman recovered. The facts which the doctor desired to bring out are the following: we learn from the text-books, and I am also very interested to hear from Dr. Brodhead, that a uterus can be sewed up after rupture. The doctor had had seven cases of ruptured uteri and in not one of them did he find it possible to sew the rupture. The patients were in such a condition of shock from loss of blood and manipulations incident to delivery, that it was found best to do a hysterectomy, and, besides, the parts were generally lacerated to such an extent that it was almost impossible to suture them properly. In three of these cases, after the uterus was removed, the clamps were left in the abdomen, for twenty-four hours. The condition of the patients in such accidents is usually such that no time is to be lost; and, inasmuch as one-half of the hysterectomy has already been accomplished by the rupture, the rest can be more easily accomplished than by resorting to simple suture. The doctor was glad to hear that Dr. Brodhead had found it possible to suture the uterus in his case, but he did not see how, in those cases where a woman has lost a lot of blood and is extremely shocked, such an operation was possible.

DISCUSSION.

Dr. Dorman thought Dr. Brodhead's case of exceeding interest and particularly as it called attention to the fact that there may be spontaneous rupture of the uterus without demonstrable cause. About a year ago a colleague at the City Hospital reported such a case, where instruments were not even used and the doctor had barely reached home when he received word that a hemorrhage had taken place. He hurried back and found the woman in extreme shock, and a laceration that extended from the cervix up to the uterus. It was only by means of a prompt tamponade that he saved her life, and the case where there was an undoubted rupture of the uterus without any manipulation having been employed. Dr. Dorman thought that the proper alternative in such a case was either suture from above or below or else tamponade, and in the discussions on treatment it was on these that the attention was usually fixed. Most operators can sew up the uterus more quickly than they can remove it.

Dr. S. M. Brickner called attention to the fact that patients in deep shock do recover after rigid tamponade of the lower uterine segment. He had had four cases under observation, three of whom had made absolutely perfect recoveries after being tamponed, although they were suffering from extreme shock. The fourth was practically moribund when first seen and did not recover. He believed that this is the concensus of opinion among extensive operators. If the uterine artery is not torn, the results from packing are good, they certainly were in the few cases which he had seen.

Dr. H. P. De Forest reported a case of rupture of the uterus which he had seen about a year ago, in which he was called in consultation, because the natural expulsive forces were ineffective and operative interference of some kind seemed necessary. The patient was a primipara of twenty-two, at term. The pelvis exhibited a moderate degree of flattening, the external conjugate being 17 cm. and the true conjugate 7 cm. The head presented at the pelvic brim but was not engaged. No fetal heart sounds had been heard for some time. Meconium was present in the liquor amnii which was draining away at the time of examination. Cesarean section, symphysiotomy and pubiotomy were all rejected because of the almost certain fact that the uterine cavity was infected and the child dead. A tentative application of high forceps was made, but as the head could be made to engage their use was discontinued. The birth canal was thoroughly dilated and podalic version performed without difficulty. The arms were extended above the head but were finally released after some effort and considerable force was needed to deliver the after-coming head. The child was still-born—no pulsations of the cord were felt at the time the version was being done. The patient had been under an anesthetic for about an hour, which was discontinued as soon as the head was delivered. The woman was suffering from extreme shock, apparently the result of the prolonged and exhausting labor combined with the ether narcosis. Considerable bleeding occurred as soon as the child was born and the placenta was immediately extracted .

The hand was then passed at once into the uterine cavity for this purpose and the unpleasant discovery made for the first time that a laceration of the uterus existed, beginning at the left side of the cervix and extending to the Fallopian tube on the same side. Through this wound the placenta had been forced into the abdominal cavity where it was found lying, surrounded by coils of intestine. It was at once removed and as no facilities were at hand for a proper performance of an abdominal section, an ambulance was called.

While waiting for the arrival of the ambulance, an attempt was made to tampon the uterus but the bleeding was so profuse and the loss of blood so great that it seemed wise to risk sepsis and control the bleeding vessels if possible.

The abdomen was hastily opened in the median line and several branches of the uterine artery, and probably of the ovarian artery also, were found to be bleeding profusely. These bleeding vessels were clamped or sutured. The abdominal wound was hastily closed, leaving two clamps still applied to the bleeding arteries; and by the time the ambulance arrived the patient was ready to be removed to the hospital.

She reached the Lying-In Hospital still alive, where she was seen at once by Dr. Kosmak of this society, but she died before any further operation cauld be performed.

An examination of the wound and uterus after death showed that the entire left half of the uterus had been divided by the laceration; that the hasty operation had quite controlled the hemorrhage and that the loss of blood combined with extreme shock had been the cause of death.

It is possible that had the uterus been tamponed, the woman might have rallied sufficiently to have had a subsequent operation, but in the presence of free and profuse arterial hemorrhage it seemed best to try and control this by clamps and ligatures rather than by the uncertain application of an intrauterine tamponade.

Just when the laceration began it is difficult to state with certainty, but probably one or the other arm started the tear in the cervix when they were brought down, and the efforts made to deliver the after-coming head caused the laceration to extend toward the fundus.

The child weighed 9 pounds, 4 ounces, and was too large to be delivered alive through the birth canal.

Dr. G. A. Peck said that in deciding the problem whether we should sew the uterus or do a hysterectomy, the question of infection is of the greatest importance. He was called to a case similar to the one reported by Dr. De Forest. The patient was an Italian with a flattened pelvis in whom a version had been done. She sustained a tear which ran three or four inches up the cervix and could be readily seen. She was taken to the hospital where the abdomen was opened by Dr. Peck and the uterine wound closed by suture. The patient recovered from the operation with comparatively little shock. Then she became septic and died from the effects. Therefore it was necessary to determine if possible whether or not a previous infection was present; if not, the uterus could be repaired by suture.

Dr. R. T. Frank believed that in treating rupture of the uterus, two things should be considered: Whether or not the rupture extended into the peritoneal cavity. If the rupture is peritoneal, operation as soon as possible is indicated; but if the tear is in the cervix, or lower segment, then packing would seem to be more advisable, if this can be done sufficiently thoroughly to completely control the bleeding.

Dr. Brodhead, in closing, stated that while reading up the literature on rupture of the uterus in the Cesarean cicatrix, he found that of the twenty cases reported, suture was the treatment in six, all of which recovered. Dorland, in 1904, collected a large number of cases of rupture of the uterus, in ten of which the uterus was sutured, with one death. Five of the remaining nine became pregnant again. In three labor was normal; in one the forceps was used, and in the other labor was induced at the thirty-third week. While he believed that hysterectomy was the safest plan of treatment in some cases, yet there seemed to be no reason why, in this case, the uterus should not be sutured; and he could recall a considerable number of patients who died after hysterectomy.

Dr. Oastler said that all the cases of rupture of the uterus which he had operated upon, seven in number, had been either right or left lateral and in each one the uterine artery was torn, and was still bleeding at the time of operation. He did not believe that any method of packing would have been sufficient to stem the hemorrhage. Where the uterine artery was not torn and where only the lower portion of the broad ligament was involved, packing might do but he did not think it was possible however without running great risk.

The first paper of the evening was on

INCARCERATION OF THE PREGNANT UTERUS,*

by Dr. Ralph Waldo Lobenstine.

DISCUSSION.

Dr. Brodhead, who opened the discussion, stated that one point which was brought out was a very good one, namely that a patient should come early in pregnancy and be examined in order that we may ascertain the position of the uterus, as there are a number of women who never suffer from symptoms of displacement. Tampons or a suitable pessary will usually give excellent results. No case of true incarceration had come to Dr. Brodhead's notice thus far.

Dr. Brickner desired to congratulate Dr. Lobenstine on his conservatism. He had had three or four cases of incarceration of the pregnant uterus which were reported about six years ago. He endorsed Dr. Lobenstine's advice in relation to anesthesia. As it is sometimes a difficult matter to replace the uterus, a suggestion advocated by Schultze is of value. This consists of the use of a tenaculum or bullet forceps fastened to the anterior lip of the cervix, by means of which the uterus is pulled downward while the other hand pushes the fundus upward. This was successful in one case, where even under anesthesia reduction was not possible by the other methods. There were one or two points he desired to touch upon. Dr. Lobenstine did not mention the kind of pessary useful in these cases. The one he himself employed was the Hodge-Smith, which stretches the posterior fornix to such an extent that it makes the return of the organ to its former malposition practically impossible. Now with regard to the use of pessaries after the incarceration is corrected, he took issue with the reader of the paper for this reason, that the incarceration does take place until after the period had elapsed when the uterus would no longer come forward, that is, after three and a half to four months. If the uterus is subsequently brought forward, it would not fall back into the scaral cavity, even though no pessaries were used. The semi-prone or the knee-chest position is sufficient to keep it in position then. But the most important part is the prophylaxis, which consists of the early examination of the patients who are going, contrary to their former practice, to engage a physician at a much earlier date than used to be the case. The second point is in the after-care of parturient women. For many years he had not permitted his patients to lie on their backs exclusively, particularly after the seventh or eighth day, for if the patient does this there is a tendency for the uterus to fall backward. This must be regarded as of the greatest importance. One point which the reader did not bring out he desired to mention, namely that these conditions are more frequently met with in multiparæ than in primiparæ.

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* For original article, see page 1003.

Dr. F. A. Oastler stated that during an experience of twelve years at the Vanderbilt Clinic, he had seen many of these cases of retro-displacement in pregnancy and tried all manner of means to correct them. He had come to the conclusion that, unless a uterus can be readily replaced, the patient should have an anesthetic. He had seen trouble produced in cases where the replacement was attempted without an anesthetic, and none whatever where this was used. In all cases where moderate traction on the uterus has been used without result, an anesthetic is recommended. As far as the ring is concerned, he did not think it would make any difference whether it is the Hodge-Smith, or the Smith or the Hodge instrument, the uterus would remain in place with any ring if it were properly adjusted. Dr. Oastler had but one case which might be called an incarceration of the uterus. The woman was three and a half months along when he saw her. It was her first child, and she had not seen a physician previously. She complained of two sets of symptoms, abdominal pain referable to the pelvis, and inability to pass urine. He examined her after drawing off twenty-four ounces of urine by catheter. The uterus was retroverted, fixed, and no effort was made to replace it. The woman was told she would require an anesthetic, and when this was given the uterus was replaced but with some difficulty. It remained in place and no pessary seemed to be necessary under such conditions. There was one question which he desired to ask. Would it be possible to go in between the bladder and uterus through the anterior fornix, and after introducing the fingers pull the uterus forward aided by pushing with the other hand, and in this way avoid a laparotomy? Would this not be feasible if the vagina were sufficiently large as in so many of these women?

DR. DORMAN stated that there was another reason for introducing a pessary in this class of cases, and that is that the retroverted uterus is directly in the line of trauma from coitus; and many of the women therefore miscarry as a result. While many of these deformities will correct themselves, it is our place to watch them and see that the uterus is in position so that the danger of miscarriage may be avoided. He thought that there was a distinct type of incarceration of the uterus where a pessary is indicated following replacement, namely where the incarceration is suddenly produced. Here, where recurrence is likely to occur, the pessary may be safely introduced for a short time. He had in mind a case in Bellevue where a woman came in with the diagnosis made. She was about three months pregnant, and stated that the day before she felt her uterus tip over. She called in a doctor and he catheterized her. She had temporary relief, but the next day she was suffering acutely. The bladder was much enlarged, and after catheterization the uterus was replaced. That was a case in which it would have been safer to use a temporary support. In a second case, where three months had passed, the patient was having considerable pain and bleeding. It was necessary to give her an anesthetic, and then the direct traction method referred to by Dr. Brickner was employed. He did not feel safe to leave this woman without a pessary, as by straining she was likely to get the uterus back again. In the case reported by the reader of the paper, a diagnosis of ectopic was suggested. The first case seen by Dr. Dorman which was thought to be an incarceration proved to be an ectopic. It was one in which a mass was found projecting into the posterior vaginal wall. This was the fetal head. Dr. Cragin proceeded to a laparotomy, and the first thing discovered was the child's foot free in the abdominal cavity. It was a true ectopic with a living child, which survived. The uterus with the sack, was removed. In that case, except for the previous history, incarceration of the uterus was suggested.

DR. LOBENSTINE, in closing the discussion, said he was pleased to hear what had been said in favor of anesthesia in these cases, which seemed to him a distinct advantage where no result is obtained with the ordinary manipulations. In regard to Dr. Brickner's remarks about the use of a pessary after the correction of an incarcerated uterus, he desired to say that such a uterus will not always remain in place after reduction and that either a pessary or tamponade may be required temporarily. The chief reason for this lay in the fact that in the severe cases the uterus is unusually cystic and will therefore easily slip back to its previous posterior position. In reply to Dr. Oastler's question about making an incision anterior to the cervix in order to facilitate replacement, he desired to say that he believed such a procedure would be impossible in the severer cases of retroversion with incarceration, while with the retroflexed incarcerated gravid uterus this method would, he thought, be very likely to produce abortions.

DR. JOHN O. POLAK, the guest of the evening, read the next paper, on

SOME SEQUELÆ OF PRESENT-DAY LABORS.*

DISCUSSION.

DR. E. A. GALLANT, who was asked to open the discussion on Dr. Polak's paper, said that some of the members who had listened to a paper read by him about five years ago on this subject of "posture" in the puerperium might recall that some of his suggestions were objected to, particularly his recommendation that certain positions be employed to prevent retroversion. This, however, had remained his practice for ten years, and he believed that in this way retroversion could be avoided. His impression was that the uterus could not lie too far forward, for it then lay in its normal position with the bladder as a cushion. A pessary postpartum he always used, and he frequently packed the vagina on the fourth or fifth day after labor in order to prevent displacement, especially if the patient had had a previous displacement and then introduced a pessary when the woman was ready to get out of bed, whether this be the eighth, tenth, or twelfth day. The pessary should be modified in shape to suit the case. In some cases he preferred the hollow rubber ring, either hard or soft, as this is of sufficient bulk to fill the vagina and act as a real support. One of his patients had a fracture of the symphysis before labor which was not recognized until the attempt to deliver with forceps was made. As the head was pulled upon, a crackling noise was produced, which was recognized as due to a separation at the symphysis. The woman was about forty years of age and there had evidently been an ossification, which gave way however toward the end of her pregnancy. Dr. Gallant referred to a paper published recently in which it was claimed that although the mortality among puerperal women in the hospitals had been reduced, the death rate in private practice is still equal, if not greater, than thirty or forty years ago.

DR. F. A. DORMAN asked whether he understood Dr. Polak correctly in his statement that the colpyreunter was used as a routine in all primiparæ and whether he felt that by the use of this instrument he secured better cervical dilatation. In his experience with the use of the cervical bags, after they have been expelled from the cervix, the uterine contractions appear to be reflexly inhibited. Dr. Polak had stated that the vaginal bags cause expulsive pains, but he himself always felt that expulsive pains were undesirable until the cervix was well open.

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* For original article, see page 1016.

DR. G. L. BRODHEAD expressed surprise at the statement made by the reader of the paper that the latter found retroversion present in such a large number of cases when he examined them between the fourth and sixth weeks. Although unable to state the exact proportion in his own patients, yet the number seemed unusually large. He generally examined his puerperal patients after three or four weeks, and if involution proceeded without symptoms, it was not his custom to examine them again. They are advised, however, to come again if any symptoms arise to make vaginal examination seem necessary. It seemed to Dr. Brodhead that if there are such a large number of women with uterine displacements after labor, the majority do not have any symptoms The point made by Dr. Polak about subinvolution, he considered most important, for it is undoubtedly the cause of many gynecological disorders. If the uterus is well involuted, and kept in good position, lacerations of the cervix will not, as a rule, give trouble. The uterus should be well involuted before a pessary is introduced. In regard to puerperal cystitis, it was his custom formerly, as he had been taught to do, to have the patient catheterized if necessary every eight hours. He considered this a grave mistake. It is now his routine procedure to allow the woman to sit on a commode or chamber if she cannot void on the bed-pan. If catheterization can be avoided, and it really seems very rarely necessary, puerperal cystitis will become a very infrequent complication.

DR. LOBENSTINE desired to refer briefly to a few points in Dr. Polak's paper. First, in regard to the vast amount of damage done to the cervix and lower uterine segment by the improper use of forceps. In some cases the forceps are employed to drag the head through a rigid rim of the cervix. This is a common error. In another class of cases the ignorant "would-be" obstetrician fails to introduce the blades within the undilated cervix, and often includes the infravaginal portion of the cervix between the blades of the instrument. In the second place, he desired to call attention to the frequency with which retroversions are found six weeks after labor. The obstetrician is responsible for a certain number of these, but not for all. The so-called congenital retrodisplacements are but rarely cured by pregnancy —contrary to the prevailing teaching. In these patients we find that despite the greatest care in the puerperium, the uterus will still drop backward in the course of a few weeks. Finally it remained his belief that it was best to suture immediately all perineal and vaginal lacerations as well as all deep tears of the cervix. He was certain that the chances of either local or general infection was greatly increased by a gaping, lacerated vaginal outlet. This was especially true of infection with the colon bacillus, to which organism insufficient attention has yet been given, and which really is responsible for a greal deal of local damage, and which may at times even cause death.

Dr. Polak, in closing the discussion, said regarding Dr. Gallant's question of forward displacement, that the puerperal uterus may be displaced forward or there may be an angulation of the cervix which obstructs the lochial flow or results in hemorrhage. This angulation is due to the increased weight of the body of uterus and this condition is particularly liable to occur in the presence of relaxed soft parts, with a large uterus in a large pelvis. Dr. Polak expected to have the colpeurynteur criticized. He used it in unengaged occipito-posterior positions to secure dilatation for, as he stated in his paper, it causes upward pressure against the membranes during the pains and preserves them. It seems to secure better dilatation, and more rapidly than any other means he had ever employed. He learned to use it and learned its value from an old practitioner who frequently used the vaginal tamponade. He and the reader worked together. Dr. Polak would go and see the patient and use the tamponade or colpeurynteur, and when the dilatation was complete his older associate would come and deliver the patient. They found that in the same way this tamponade was useful in cases where the membranes had ruptured spontaneously early in the course of the labor. Dr. Polak seldom used a bag inside of the cervix. He found that while he could secure full dilatation, or at least to the capacity of the bag, yet behind the bag was a lower "uterine segment," which caused trouble in the delivery. He therefore adopted a modified vaginal Cesarean operation for undilated cervices, which has given him much less trouble. In reply to Dr. Brodhead's doubt, as to the large number of retrodisplacements, he had noted that if an examination were made between the sixth and eighth week, a large number presented a retroversion of the second degree, which would continue for the rest of their lives if not corrected at this time. Only forty-three cases of retroversion were noted on the tenth day, yet two hundred and thirty-one, coming for a final examination between the sixth and eighth week, showed a retroversion. These displacements were movable in the majority of the cases, and many of them undoubtedly recur upon the withdrawal of the pessary. A point brought out by Dr. Lobenstine should be emphasized, namely, that a patient who had a retroversion before or during pregnancy would have it after labor, no matter what is done to prevent it. In the reposition of these deformities, it is well to take the suggestion of the late Dr. Hanks, who advised treating such patients in the knee-chest position with tampons which remained in place until the woman's return visit when they were to be reinserted with the patient again in this same position. This treatment always preceded the introduction of the pessary.

Dr. Polak allowed some of his patients to get out of bed on the fourth day, others not until the twelfth or fifteenth. (This in answer to a question by Dr. Gilmour.) It depended entirely upon the involution of the uterus or if on examination an exudate due to a uterine or pelvic phlebitis, was detected. The presence of a temperature also decided further rest in bed; for a temperature of 100° or 100.5° F., about the tenth day usually meant some trouble.

As regards the treatment of puerperal cystitis, replying to a question of Dr. Hayes, he used the simple device of Dr. Dickenson, namely a double current pipette with a suction bulb. This is introduced into the bladder to drain off the urine, and when the viscus is empty a 20 to 50 per cent. solution of argyrol is introduced. Irrigations of the bladder in such cases he considered harmful. Dr. Lobenstine's remark about the injury produced by dragging down the cervix with forceps, should include that to the anterior vaginal wall and the production of cystocele. As regards sutures, he used the immediate suture up to four years ago in all cases, but then found that the results were not always entirely satisfactory and consequently adopted the other plan. Since the employment of the forty-eight hour plan, a much more satisfactory series of unions were obtained particularly in extensive lacerations. The fact that in a later operation it is usually possible to secure better light and assistance, and therefore to locate the extent of the tear more thoroughly, makes a better aseptic surgical repair and consequently better ultimate results.

REVIEWS.

THE MALARIAL FEVERS, HEMOGLOBINURIC FEVER AND THE BLOOD PROTOZOA OF MAN. By CHARLES F. CRAIG, M. D., Captain Medical Corps, U. S. Army, etc. Pp. 477. Illustrated by four colored plates, twenty-five clinical charts, and twenty-eight photomicrographs and drawings. New York: William Wood & Company, 1909.

This very complete volume contains an account not only of æstivo-autumnal malaria, as did the writer's former work, but of all types of malarial fever. The author's experience in the military hospitals of Cuba, the Philippines and this country has afforded very unusual opportunities for the study of this disease under various circumstances. The importance of a knowledge of the malarial fevers has been greatly increased by the return of infected soldiers from the Philippines, bringing the æstivo-autumnal parasites to infect new localities in this country. The writer urges blood examination of all persons coming from malarial regions and administration of quinine to all infected persons for the protection of the community. The classification of malarial organisms which he has adopted is as follows: 1. Plasmodium malariæ (quartan parasite); 2. Plasmodium vivax (tertian parasite); 3. Plasmodium falciparum (tertian æstivo-autumnal parasite); 4. Plasmodium falciparum quotidianum (quotidian æstivo-autumnal parasite). It is in accepting the existence of two forms of æstivo-autumnal parasite that the writer differs from many others. After describing the geographical distribution of malarial fevers, he discusses the morphology and biology and development of the plasmodia in the mosquito. Regarding acquired relative immunity, it is interesting to note that while the author's blood examinations show that in Filipino children the percentage of infections diminishes with increasing age from about 72 to 24 per cent., in the adults examined the percentage reached 62 per cent. He believes that malarial fever offers a great barrier to improving the condition of the Filipinos by its interference with effort on their part, and he advocates the free distribution of quinine in certain districts so as to increase their capacity for labor. The next chapters deal with the etiology, pathology, and symptoms of malarial fevers, including a historical review and discussion of former and accepted theories. He calls attention to the danger to others from latent cases of pernicious malarial fevers, which may carry the infection into new localities. Regarding spontaneous recovery, the writer believes that we must accept the theories of both Ehrlich and Metchnikoff, as both the formation of antiplasmodial and antitoxic materials and phagocytosis seem to be important factors. He states that pregnant women who have had attacks of malaria are more liable to puerperal fever, hemorrhage, and abortion than are others, because of the accompanying anemia and lowered vitality. A malarial paroxysm often follows parturition in women who have become infected. A blood examination for malarial plasmodia is required in such cases. Important and interesting chapters on prophylaxis and treatment follow. A chapter is devoted to hemoglobinuric fever, although the writer does not believe that it is caused by the malarial plasmodia. He discusses it as a concession to those who believe in its malarial origin and because of its frequent association with malaria. For the latter reason he appends chapters on the blood protozoa of man, since these occur in regions where the malarial fevers are common and are likely to be observed in examining blood for the diagnosis of malaria. H. D.

OBSTETRICS. A MANUAL FOR STUDENTS AND PRACTITIONERS. By DAVID JAMES EVANS, Lecturer on Obstetrics and Diseases of Infancy, McGill University, Montreal, Canada; Assistant Obstetric Physician to the Montreal Maternity; etc. Second Edition. Revised and enlarged. Small octavo, 440 pages, 172 engravings. Lea and Febiger, Philadelphia and New York, 1909.

This manual is well arranged, short and concise, covering the subject in a satisfactory way. Good judgment has been displayed in choosing many of the illustrations from the work of Farabeuf and Varnier. R. T. F.

Handbook of Obstetrics. By R. Cadwallader, A. M., M. D., Assistant in Obstetrics, University of California, Medical Department, San Francisco, California. Octavo, 370 pages, with 102 illustrations in the text. F. A. Davis Co., Philadelphia, 1908.

The author has attempted to prepare a concise book for students, which is to limit itself to the essential facts, though he has "not entirely resisted the temptation to give his personal opinions and experience." The book contains evidence of considerable experience, but the English is poor—at times theatrical, at other times almost puerile. For instance: "Sudden death in the puerperium is very rare. When it does occur it is most distressing." (!!).

The chapter on "Decidua Malin" (we suppose that chorio-epithelioma is referred to) is an unintelligible farrago composed of obsolete pathological terms of which the following is a good example: "The benign mole is the same condition (chorio-epithelium? decidua?) remaining so and undergoing myxomatous change; decidua malin is either a mole with a sarcomatous change or is so from the start."

The book is excellent in typography, attractively bound, but the illustrations show but little judgment in their selection.

R. T. F.

Transactions of the Eighth Session of the Australian Medical Congress, held in Melbourne, Victoria, October, 1902. Volumes I, II, and III.

These three large volumes show that the medical work done in the antipodes is of a high order. Particularly commendable are the published reports of the Transactions of the Sections on Pathology, Anatomy, Bacteriology and Hygiene. None of the papers of the gynecological and obstetrical section are of striking merit. The most interesting are those on polypoid endometritis by Nyulasy, and on actinomycosis of the female generative organs, by Chenhall.

E. M.

Lectures on Hysteria and Allied Vaso-motor Conditions. By Thomas Dixon Savill, M. D., London. Physician to West End Hospital for Diseases of the Nervous System, Welbeck St., London, and to St. Johns' Hospital for Diseases of the Skin, Leicester Square, London, etc. New York, William Wood & Co.; London, Henry J. Glaisher, 1909, $2.50 net.

This volume consists of a series of eleven lectures in which the personal views of the author are set forth. He maintains that hysterical phenomena are due to a lesion of some kind, usually a vaso-motor disturbance arising in the sympathetic system. This explanation appears to us a mere begging of the question. The author is not in sympathy with psychic conceptions of hysteria as set forth in recent years by Janet, Freud and Babinski.

To those who desire to know the views of the author this volume will prove of interest. It should not, however, be regarded in any way as an up-to-date or comprehensive summary of the subject of hysteria.

E. M.

THE MEDICAL RECORD VISITING LIST OR PHYSICIANS' DIARY FOR 1910. New Revised Edition. Price, for sixty patients a week, $1.50; for thirty patients a week, $1.25. New York, William Wood & Co.

This compact and handsome visiting list appears in its usual elegant binding of red or black morocco, and is published either with or without dates. For the most fastidious the list is divided into two volumes of six months each fitted into wallets of calf or seal skin. Besides the ruled pages for recording visits the list contains a calander for two years and tabulated information for reference and for use in emergencies. The more valuable of this includes a table of maximum adult doses given in both apothecaries' and metric systems, a list of poisons and their antidotes, the treatment of accidents, technic of artificial respiration, and limits on the writing of wills. The list contains also the usual pages for obstetric engagements, vaccinations, deaths, addresses, etc. Lest this outline of its contents suggest a volume the size of an unabridged dictionary we add that the list, equipped with a full-sized pencil, weighs just six and three-quarter ounces.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Tarsalgia in the Puerperal State.—Tissier and Goutiex (*Réunion Obstét. de Lyon*, May 25, 1909) describe the mechanism of a sort of flat-foot which is acquired by the pregnant woman, and which is not a prominent symptom until she gets up from her bed, after the two or three weeks of enforced rest which her physician has prescribed. This is a true tarsalgia of some severity, resulting from the general arterial relaxation consequent upon of lying in bed, and the habit she has formed, in order to keep her balance, of walking with her feet wide apart and resting the weight of the body on the toes instead of the heels, as is normally done. The result of this gait is an atrophy of the posterior leg muscles, which is increased by lying in bed. Also the astragalus, not bearing the weight, is pushed to one side, and the body rests on the calcaneum. The oblique position of the tibia still further pushes the calcaneum outward and accentuates the valgus. The arch loses its tone, sinks under the weight of the body, and pain in walking develops. The calcaneum has become sensitive. This condition shows itself as soon as the woman rises from her bed and begins to walk about. It is easily and promptly curable. A pad under the arch of the foot, or the wearing for a short time of a flat-foot plate, combined with appropriate exercises, will accomplish a cure.

Acute Pulmonary Edema in Parturient Women.—A. Bonnet-Laborderie (*Jour. des Sci. Méd. de Lille*, June, 1909) says that acute pulmonary edema is sometimes an accident of pregnancy, often of labor, and still more frequently of delivery, or the period immediately after delivery. Regarding the mode of its production, the author finds that cardio-renal lesions, isolated or associated with one another, are generally the causes of pulmonary edema. There are cases in which this complication occurs which show no lesions of either the heart or the kidneys. The pathogenesis of these cases, based upon theoretical considerations, cannot be definitely established until further researches have been made. The author rejects the theory of Huchard that the condition is due to aortitis or periaortitis, and also that of hyperactivity of the suprarenals. The author relates a case observed by himself in which the patient was strong and healthy, and had no bad symptoms during pregnancy, and was a normal labor. At the end of delivery she had a severe attack of dyspnea. Examination of the heart showed nothing abnormal, and not even a trace of albumin appeared in the urine. The following day she was perfectly well. As labor proceeds the pulse becomes more frequent and the arterial tension increases, and when delivery has been accomplished the tension is not at once lowered, on account of the removal from the circulation of the fetal veins and arteries and the placental circulation.

Opsonic Index in Pregnant and Parturient Women and in the New-born.—As the result of their investigations with cultures of staphylococci, V. Cathala and P. Lequeux (*L'Obstétrique*, June, 1909) conclude that in the pregnant woman the opsonic index is raised, at least during the latter months of gestation. The variations seem to be greater than during the nonpregnant state. Its increase is perhaps due to hyperfunctionating of the glands of internal secretion, particularly of the thyroid gland. The opsonic index, lowered after delivery, rises during the following day. During the puerperium it is about normal or slightly higher and always varies greatly. In the new-born the blood contains opsonins at birth. The index, about ninety, perhaps a little lower in the blood of the cord, seems to diminish slightly during the first days of life. In women with puerperal infection the opsonic index, studied with the staphylococcus, is generally more or less lowered, more so when the infection is severe. It is not, however, possible to base a prognosis upon this. In women with abscess of the breast of staphylococcic origin the opsonic index was always found to be lowered. In infants with staphylococcic infections the opsonic index diminishes considerably

Dystocia Due to Excessive Size of the Fetus.—W. Stone (*Surg. Gyn. Obst.*, July, 1909) states that disproportion between the fetal head and the maternal pelvis, due to the abnormal size of the head, are a frequent cause of death of the child and of injury to the mother. That they may be successfully treated in most instances by induction of labor performed one or two weeks before the estimated time of labor. That such a disproportion is associated with a prolongation of pregnancy beyond the ordinary duration frequently enough to warrant us in never allowing a case to go "overtime" unless there is positive evidence from a careful examination that no disproportion exists.

Operative Procedures for Relief of Dystocia.—In discussing this subject, H. A. Miller (*Surg. Gyn. Obst.*, July, 1909) says that in a perfectly healthy individual where we have no evidence of toxemia, it is justifiable to make an attempt to prevent the overgrowth of the child. In properly selected cases induced labor is less dangerous for the mother, carrying with it a lower mortality than either pubiotomy or Cesarean section. The induction of premature labor is probably the choice of procedures in cases where the delivery can readily be accomplished at the thirty-sixth week or beyond, and in some instances might be indicated a week or more prior to this time. The proper time for interference should be determined by the Stone method of measuring the fetal head while still in the uterus, by careful pelvic measurements, and by repeated bimanual examinations by Müller's method. It is extremely important to provide skilled care for the premature infant for at least two months after delivery, and the most essential part of this skilled care is that the child be breast-fed, either by the mother or a wet nurse. Pubiotomy has a field which is relatively small, still where it is possible it gives a lower maternal mortality than Cesarean section. Pubiotomy carries with it relatively little danger of infection, as the wounds do not communicate in any way with the pelvic canal or the peritoneal cavity. Accidents in pubiotomy are relatively harmless, as injuries to the bladder can be successfully repaired, and a hemorrhage causing hematoma of the labia is seldom a matter of importance and usually clears up in a short time. Lacerations in the vaginal wall have occurred in a few cases. They should be examined for, and if they exist an immediate repair is indicated. The majority of injuries to the bladder-wall have been due to too rapid separation of the bones and too rapid delivery. For that reason the separation of the bones should be under control of the operator, and after bony separation, labor should be allowed to go on in its natural way unless some absolute indication exists for instrumental delivery. In cases where a theoretical infection already exists it gives a decidedly lower mortality than Cesarean section. Cesarean section should be the operation of choice where the other procedures are not indicated or where the relative size of the pelvis and the fetal head is such that we cannot hope to secure a living infant from premature delivery or pubiotomy. The method of delivery in any individual case should be determined before labor actually starts, as the maternal mortality comes largely from operations having been done when delivery by the natural forces supplemented by forceps operations have failed. Under no condition is craniotomy upon the living child justifiable.

Polypoid Endometritis Complicating Pregnancy and the Puerperium.—F. A. Nyulasy (*Jour. Obst. Gyn. Brit. Emp.*, July, [illegible]) discusses a condition termed polypoid decidual endometritis which, he states, is a result of pre-existing chronic endometritis beginning prior to, or coincidentally with, pregnancy, and continued into the puerperium, during which acute processes are grafted upon the chronic condition in consequence of septic infection. The endometritis of pregnancy has its prototypes in the ordinary glandular, interstitial, or polypoid forms of endometritis met with in the nonpregnant uterus. It may, therefore, in most cases be looked upon merely as the extension of a lesion already existing at the time of conception, and modified by the changes incidental thereto. In many cases it is found to be distinctly syphilitic in origin. It is not merely a hypertrophy of the decidua, that is, a uniform increase of all its tissue elements, either in size or number. The writer's sections show extraordinary development of some of its constituents, notably the vessels, less so the interstitial portion, while very few glands are found in full-time pregnancy. In many of these cases, the placenta may be expelled without expression, and apparently "complete," leaving on its site large or small, irregularly rounded, or dome-shaped masses of chronically inflamed decidua so full of vessels as to resemble cavernous angiomata. These masses are favorable bed for the development of septic organisms, and account for many of the cases where the most careful practitioners have apparently "left something behind," even after a minute scrutiny of the expelled placenta, including its examination under water. Sepsis in the retained masses is predisposed to by so-called necrobiotic changes. The writer has encountered over 100 cases of polypoid endometritis and he estimates that it will be found in from 3 to 5 per cent. of all pregnancies. Endometritis—glandular interstitial or polypoid—is considered the most important factor in the production of spontaneous abortion. Many cases of adherent placenta are due to it. The symptoms are practically those usually attributed to adherent placenta, namely, rise of pulse, then of temperature, with a rigor, to 103° or 104° F. Fetor of the lochia may be entirely absent. Profuse secondary hemorrhage is not common, but a sudden rather free flow after its partial stoppage is suggestive. Diagnosis depends on the presence of subinvolution, a patulous os, generally admitting two fingers, and in the uterus a mass of varying size, usually covered with blood-clot, together with the symptoms above described. Excepting cases of such virulent infection that the patient is overwhelmed by violent septicemia, practically every case recovers if the operation is done early, but the danger is extreme if it is delayed. Early curettage, with the use of the ungloved finger, or fingers, and a large-looped moderately sharp curette is essential for the satisfactory removal of polypoid conditions of the endometrium in the puerperal woman.

Scopolamine-morphine Narcosis in Labor.—J. Halliday Croom (*Jour. Obst. Gyn. Brit. Emp.*, July, 1909) has found that for an ordinary case the best dose is one two-hundredth of a grain of scopolamine plus one-sixth of a grain of morphine, given when the pains are coming regularly at intervals of a few minutes. The scopolamine may require to be repeated in the course of one and a half or two hours. As a rule, one two-hundredth of a grain is sufficient as a second dose. It is better not to repeat the morphia. In all cases the dosage, particularly the second dose, must be gauged by the patient's state of mind as to wakefulness or excitement, and by her power of perception and memory of what is going on around her.

Treatment of Placenta Previa.—Paul Bar (*Jour. de Méd. et de Chir.*, July 2, 1909) gives the indications for treatment of placenta previa according to the amount and severity of hemorrhage which has occurred. The use of the tampon is only provisional and temporary, and it is liable to be the cause of infection. If the woman is not bleeding much, but hemorrhage is feared, in case dilatation is complete, version is in order when possible, followed by extraction. If dilatation is incomplete but the cervix is pervious, a large balloon should be employed to obtain dilatation. If there is no dilatation at all Bossi's dilator should be used to begin dilatation, and the balloon then inserted. If the woman is bleeding severely and dilatation is good, version is to be done in spite of the risks to the child. If the cervix is only permeable, version and extraction are in order. If there is no dilatation the use of Bossi's dilator should be followed by version. All these methods fail in cases of rapid and dangerous hemorrhage. In these cases Cesarean section will save the child, but the mother runs a great risk of infection, and of shock. A suprasymphyseal operation has been proposed, which allows of the removal of the fetus extraperitoneally, and the author thinks well of this operation as a last resort.

Repeated Casarean Section.—Garipuy (*Presse Médicale*, July, 1909) says that repeated Cesarean sections are comparatively frequent, yet there are some difficulties in the second operation that do not occur in the first. The first question of interest in a second operation is the time at which it should be performed. In the first operation it is best to wait until uterine contraction is good, in order to see whether delivery can occur spontaneously. In the second operation there is no chance of this, and there is no use in waiting for strong contractions since these may have a bad effect on a uterus if it has been weakened by an imperfect cicatrix of the previous operation. The best time to operate is when the pregnancy has arrived at term and labor is about to begin. The hindrances that the operator may meet with on entering the abdomen are adhesions to the intestines, to the abdominal walls, and to the omentum. The incision is generally made through the old cicatrix. The omental adhesions are of little importance, and are easily broken up. Intestinal adhesions are more important. An attempt must be made carefully to separate them. Adhesions of the uterus to the abdominal walls may render it impossible to enter the uterus at the preferred point, the ring of Bandl. In some cases they cannot be separated, and one must make a transverse incision, or an anteroposterior incision higher up in the fundus. The extraction of the placenta may be rendered difficult by adhesions to the cicatrix. Adhesions may also interfere with the control of hemorrhage or suturing the wound. Still the prognosis of second sections is not much worse than that of first ones. Hysterectomy may become necessary on account of severe hemorrhage, rupture of the uterus, or fear of infection. The question of sterilization is not doubtful in case of a fourth section with severe adhesions, and it may be desirable earlier than the fourth.

Torsion of Uterine Fibromata in the Course of Pregnancy.—G. Piquand and J. Lemeland (*L'Obstét.*, July, 1909) say that torsion of the pedicle of a fibroid in the course of pregnancy is a rare occurrence. It occurs especially in primiparæ of advanced age in the first half of pregnancy, and pregnancy alone is not its cause. The predisposing factors are length and thinness of the pedicle, lateral insertion of the pedicle into the uterus, large volume of the tumor, ovoid or reniform shape of the tumor, and noncentral insertion of the pedicle on the fibroma. Determining causes are tumors in the neighborhood of the fibroma acting as mechanical causes of torsion, and distention of the bladder and bowel. The pedicle consists of a serous covering enclosing a mass of edematous connective tissue, with a few muscular and elastic fibers. As a result of the torsion the growth may undergo any sort of degeneration, from softening to gangrene. Slow torsion causes change of position of the tumor, lessened mobility, relatively rapid increase in size, softening, and tenderness. Generally it occurs more quickly and is accompanied by severe pain, chills, collapse, and syncope, ending in death from peritonitis, preceded often by abortion. It is a very serious complication for the pregnant woman. It demands immediate surgical interference. The operation to be preferred is laparotomy, and removal of the tumor without touching the uterus any more than is necessary, in the hope that pregnancy will go on to its normal end.

Vomiting of Pregnancy.—A. Pinard (*Ann. de Gyn. et d'Obst.*, July and August, 1909) says that it is the experience of the ages that gestation is not a harmonious symbiosis. A normal process in the cow, with which she gets along perfectly well, in the woman it is accompanied by vomiting, and various nervous symptoms that sometimes end in death. Most authors follow the description of Dubois, who divided the vomiting of pregnancy into three periods: a first of emaciation, a second, febrile period, and a third of nervous accidents. The author does not agree with this classification. He has never seen cases in which there was a distinct febrile period. In many cases there is a change in the pulse without any fever until the very end, when death is impending. As a result of the experience of thirty years in obstetrics the author finds that about fifty-eight women out of 100 vomit, and forty-two do not. Vomiting is more frequent in primiparæ than in multiparæ. Vomiting may begin at any time from the first week after the last period to the ninth month. In most it ceases about the fourth month. Women with multiple pregnancies are more likely to vomit than those having simple pregnancies. He has seen vomiting twice in women who had extrauterine pregnancies, one in the second, the other in the third month. In both, pregnancy went on to near term and was terminated by operation. The average duration is three months, but some have vomiting throughout the entire pregnancy. It occurs in women in whom the ovum has become degenerated, and here the type of vomiting is especially severe. It also occurs when hydatidiform masses are contained in the uterus. Almost all women who vomit become emaciated; some suffer much from incessant costo-diaphragmatic pains, others cough or hiccough incessantly. Ptyalism is a frequent symptom. In women with emaciation, failure of sight, and general feebleness, fever may not have been present, nor changes in the pulse. But in many women the author has seen changes in the pulse, acceleration, variability, rapidity, and lowered arterial tension; inspiration may be accelerated at the same time to forty or fifty per minute. Constipation is the rule, thirst is extreme, the tongue red and dry, hallucinations occur, and vomiting ceases a few days before death. The volume of the uterus does not seem to be as great as usual, probably on account of the dehydration of the organism, and its walls are soft. The changes in the pulse may last as long as three weeks after the interruption of pregnancy. After abortion paralysis and amyotrophia of the lower limbs has occurred. After a long discussion of the etiology of this complication the author concludes by asserting his belief that it is not a nervous condition, although it may occur in those predisposed to nervous troubles. It is essentially the result of intoxication, from some unknown poison developed within the patient as a result of the pregnant condition. Acceleration of the pulse may occur as early as the second month; in women who have had vomiting cease in previous pregnancies; it is generally progressive when it has once occurred. Pathological anatomy has shown that there are no lesions of the gastrointestinal tract. The author believes that there is an action on the vomiting center in the medulla by some poison in the blood. This principle is toxic to the entire nervous system. Some women triumph over this intoxicating principle and survive; others succumb and it is fatal. This poison is similar to the one which causes eclampsia. How many more there are is still unknown, or what causes them. As to the treatment, the best method is to place the patient on a simple milk diet, or one containing vegetables. Meats and eggs seem to be especially poisonous. If this fails it becomes necessary to interrupt pregnancy. When the number of pulse beats reaches more than 100 it is best not to wait any longer before emptying the uterus. The subcutaneous injection of normal salt solution is of value after the operation.

Chemical Examination of the Blood in Osteomalacia.—Salvatore Capellani (*Ann. di. Ostet. e Gin.*, Aug., 1909) reviews the various theories that have been advanced as to the causation of osteomalacia. The author believes that there are not sufficient grounds for believing that an abnormal condition of the ovarian secretion is its cause. This theory is based upon the benefits that are in some cases derived from the removal of the ovaries. This is really due to the general improvement of condition that results from the operation. The author undertook the examination of the blood of osteomalacic patients before and after castration, estimating the phosphorus, lime, magnesium, and nitrogen contained in it. He finds that the amount of phosphorus contained is within normal limits during pregnancy, even in the active period of the disease, and is increased after the expulsion of the ovum, and the removal of uterus and ovaries while the period of convalescence is beginning. The amount of lime is also increased in the same way, when considered in relation to the normal condition. It is sensibly diminished after hystero-oophorectomy, and during convalescence. Magnesium acts as does calcium. There is no marked variation in nitrogen. The results of ovariotomy are merely indirect.

GYNECOLOGY AND ABDOMINAL SURGERY.

Cystitis and Ulceration of the Bladder in Women.—John B. Shober (*Ann. Surg.*, June, 1909) say that cystitis due to the presence of microorganisms alone is unknown, but the disease is always the result of traumatism followed by infection by microorganisms. The microorganisms which attack the bladder are the bacillus coli communis, the gonococcus, the tubercle bacillus, the streptococcus, the staphylococci, and the typhoid bacillus. Streptococcic and staphylococcic infection of the bladder occurs frequently during the puerperium, especially after long, difficult, or instrumental labors, when the bladder walls may have been injured by long pressure by the child's head, or by overdistention and stretching of the walls of the bladder. The writer describes the treatment which proved effective in a case of this type with several ulcers and marked hyperemia. Ten local treatments were given within thirty-six days, all under cocaine urethral anesthesia with the patient in Trendelenburg position. The bladder was previously irrigated with boracic acid solution and catheterized. The cystoscope was introduced; any remaining fluid was sucked out with a bulb; each ulcer was gently dried with a pledget of cotton on a wood applicator, then it was gently mopped with a weak adrenalin solution to check bleeding; any loose shreds were removed from the ulcers with the bladder forceps; after which each ulcer was touched with a pledget of cotton soaked in a 1:8 solution of nitrate of silver. The patient was then lowered, the bladder emptied of air, and three ounces of a 2 per cent. solution of protargol was instilled. The patient could usually retain this for a half-hour. These treatments were made every second or third day. She received a daily irrigation of boracic acid solution followed by the instillation of 2 per cent. solution of protargol. Absolute rest in bed was insisted on with a restricted diet, and she drank freely of lithiated water.

Treatment of Malignant Tumors by High Frequency Currents.—J. A. Rivière (*Ann. D'Electrobiologie et de Radiologie*, May, 1909) began the use of high frequency currents on a wound that would not cicatrize, and which after the treatment healed in a few days. Since then he has used these currents under various forms. The apparatus of Oudin gave him great satisfaction. The author applied the current in a number of intractable maladies, especially tuberculosis and cancer. It exercises on superficial epitheliomas a cytolytic action, which is specific and elective, causing the elimination of the neoplastic tissues. It also causes the disappearance of the infected glands, and substitutes an abundant odorless discharge for the foul one of the ulcerated surfaces, which later heal with a good cicatrix that is not deforming. The current is not painful, but on the contrary has an analgesic effect; the patients bear the applications well, and ask to have them continued longer. The application should never last more than ten minutes. The author has never seen any bad effects from the current. Denuded surfaces are best affected by the treatment. Next are growths that are superficial. For internal growths little effect is possible on account of their depth. Operation must first be done and the current used later to promote cicatrization. The author believes that this current should be applied after all operations for malignant growths.

Abdominal Hysterectomy for Cancer of the Uterus.—Henri Hartmann (*Ann. de Gyn. et d'Obst.*, July, 1909) says that after a period during which the attempt was made to remove all the affected glands and neighboring tissues when removing cancer of the uterus, a reaction has come about. The systematic search for all the glands implicated has been abandoned, since pathological studies have shown that this was not only impossible but useless. In cancer of the body of the uterus enlargements of the glands are seldom found, even when the cancer has extended so as to be inoperable. In some cases of cancer of the body we see that no glands are enlarged, hence it is futile to remove the glands. In cancer of the cervix the invasion of the glands occurs early and is very important. Hence *a priori* they should be sought for, but we find that when recurrences occur they are generally in the cicatrix of the operation, not in the glands. In some cases there is an involvement of the vaginal wall by the cancer, while there exists no involvement of the overlying mucosa. The author believes that the best operative procedure is abdominal hysterectomy, which removes the vagina and parametrium with the uterus, but leaves the glands in place, and that this is superior to vaginal hysterectomy. The indications for operation are determined after examination by the vagina and rectum, and of the bladder, show that these organs are not involved. Cystoscopy should be performed and a protrusion of the trigonum, and folds or irregularities of the mucosa should be considered as contraindicating operation. The operation should be preceded by curetting and galvano-cauterization of the cavity of the uterus, so as to render aseptic the interior, and prevent infection of the tissues in the course of the operation. A careful examination of all the neighboring tissues is carried out under ether. The uterus is drawn upward gently since the tissues are liable to be friable; the adnexa and ligaments are freed and the vagina is opened and the uterus removed. The results have shown that this operation may succeed in many cases that formerly would have been thought inoperable. The remote results for cancer of the body are excellent. According to some authors 75 per cent. of cases do not have recurrences. In cancer of the cervix the results are superior to those obtained by vaginal hysterectomy.

Operative Treatment of Uterine Carcinoma.—Otto Von Frauqué (*Monats. f. Geburts. u. Gyn.*, July, 1909) gives the statistics of his operations for uterine carcinoma. In 166 radical abdominal operations for carcinoma of the cervix the mortality was 20 per cent. In cases of medium severity there is no difference between the results of abdominal and vaginal operations. Severe cases cannot be operated upon by the vaginal route without very bad final results. As to the remote results of operations for uterine carcinoma the author summarizes 104 cases examined four years after the operation. Of the abdominal cases sixty-six involved the cervix, four the fundus; of the vaginal operations, twenty-five involved the cervix, nine the fundus; fourteen died as a result of the operation, one from intercurrent disease. Of the eighty which remained to be investigated, forty-five were without recurrence. The percentage of cured cases was 56.77.

Benign Invasion of the Uterine Mucosa and Muscle by Chorionic Epithelium.—Robert Meyer (*Berl. klin. Woch.*, June 21, 1909) describes a benign invasion of the mucosa and musculature of the uterus by cells derived from the epithelium of the chorion. The cells are derived from the epithelium of the fetal placenta which push through the masses of villi and enter the connective tissue that binds together the layers of the uterus. These cells fasten themselves upon the tissues and form larger or smaller masses of chorionic epithelium in the mucosa and muscle of the uterus. They also break through the walls of the blood-vessels and fill up their lumina. These masses penetrating deep into the musculature simulate malignant chorioepithelioma.

The author describes the histological characteristics of the benign growth. He contends that this is a perfectly natural, not a malignant process of growth, the cells of the chorion having great power of penetration into connective-tissue structures. In the later months of pregnancy the connective tissue of the uterus reacts differently, producing a coagulation wall which prevents the penetration of the chorionic cells. The author found a similar invasion in eight normal pregnant uteri removed in cases of tuberculosis of the lungs, in slighter degree. This invasion of chorionic cells may also have to do with retention of the placenta, the latter becoming adherent by means of the invasion of the connective tissue of the uterus. Whether this benignant chorionic growth can become malignant is undecided.

Relation of Gastric and Uterine Diseases.—Ludwig Lewisohn (*Berl. klin. Woch.*, July 14, 1909) says that there has been much discussion of the relation of gastric and genital troubles in women. Some contend that there is a causative relation between the two. In many normal cases of menstruation there are diminution of appetite and indigestion, with constipation preceding the establishment of the flow. The gastric acidity is less before the period, becoming normal when the flow is established. The author has tabulated his examination of 100 cases of gastric and genital troubles in which the secretions were examined after a test-breakfast, the gastric reaction determined, quantitative tests of the acidity made, the motor power of the stomach examined, and the position of the stomach determined. He found no uniform typical picture of stomach trouble accompanying genital diseases. There may be increased or diminished acidity; in many cases there was muscular insufficiency; thirty-four cases in all had decided stomach disease, while sixty-six were practically normal in that respect. Gastric difficulties may be caused by changes in the blood coincident with gynecological troubles, or by their effect on the nervous system. The author believes that the gastric symptoms are in great part reflex, dependent on the nervous disposition of the female organism. Changes in the gastric juice are easily produced by nervous conditions. Most patients in whom gastric and genital troubles coexist show evidence of a general nervous diathesis. The stomach troubles are coincident with all kinds of uterine and genital difficulties. There is probably no causative relation between the two classes of cases, and only treatment of the general system improves the gastric troubles.

Use of Suprarenin.—Braun (*Zeit. f. Gyn.*, July 24, 1909) comments on two cases of fatality as a result of the use of suprarenin injected into the cervix for operative purposes. The author and other surgeons and dentists have made use of this drug in thousands of cases for local anesthesia, combined with other drugs and have experienced no bad effects. As to the cause of the fatal cases and the poisonous dose of the drug, he states that there is no fixed poisonous amount of this drug; this varies with the individual, and with the way in which it is used. The author uses a very weak solution injected in considerable amount. He believes that it is not the amount of the drug or of the solution used, but the concentration of the solution that does harm. A large amount of a weak solution can be used without danger, while a small amount of a strong solution will be fatal. The method in which the material is introduced is also of importance. Injected intravenously it will have an immediate bad effect, while applied locally or subcutaneously it will be well borne. The author combines it with a ½ per cent. solution of novocain, and to 100 c.c. of this solution he adds 0.64 gm. of borate of suprarenin. The drugs are made up into a tablet and the solution made freshly for each operation. He has no fear of using as much as 125 c.c. of this solution for an operation.

Papillary Tuberculosis of the Vaginal Cervix.—Kurt Euerling (*Berl. klin. Woch.*, Aug. 2, 1909) says that tuberculosis is an infrequent disease of the female genital organs. He reports a case of isolated, probably primary tuberculosis of the vaginal portion of the cervix uteri, in papillary form, simulating a cauliflower cancerous growth. The commonest location is in the tubes, next in the fundus uteri, ovaries, cervix, vagina, and vulva. Genital tuberculosis usually involves several organs, rarely being located in one. It is generally secondary to involvement of the lungs, intestines, or glands. The infection may be carried to the genital organs in three ways; by the blood, lymphatics, or directly to the vagina. Direct infection through the vagina may occur in coitus, gynecological examinations, or masturbation, or from laundered clothing. A patient may infect herself from her own sputum or that of others. Infection of the cervix is extremely rare, the infection generally stopping sharply at the os internum. This is due to the protective power of the pavement epithelium covering it. The infective tissue may be in the form of miliary tubercles, ending in tuberculous ulcerations; diffuse tuberculous infiltration, with a strong tendency to cheesy or fibrous degeneration; and papillary tumors with cauliflower-like prolongations. Others add a fourth form, tuberculous catarrh, in which microscopic examination shows no bacilli or tuberculous tissue formation, only a purulent catarrhal discharge caused by the bacilli on the surface of the mucosa, which is reddened, injected, and covered with pus, the epithelium desquamating. The rarest and most interesting form is the papillary tumor. The diagnosis from carcinoma is made only by microscopic examination after total extirpation of the uterus. The author reports a case of this form of tuberculosis observed by him in a virgin twenty-five years of age, who showed no involvement of any other organ. The growth was the size of a small apple, bleeding easily, and very fragile. Microscopic examination showed it to be a tuberculous growth. Supravaginal amputation of the cervix was performed with curettage of the body of the uterus. The patient remained well after the operation, and gained in weight. Had the diagnosis not been made by examination of a portion of the growth a total extirpation would have been done. There was no evidence of infection by way of the blood current. As to a direct infection, coitus had never taken place, the hymen was intact and small, and she had never had a vaginal examination before. The extremely superficial location and circumscribed character of the growth were in favor of a primary infection.

Significance of Glandular Hyperplasia and Hypertrophy of the Endometrium.—K. Himmelheber (*Monat. f. Geb. u. Gyn.*, Aug., 1909) has made a study of the condition of the endometrium in 130 preparations, of which he has selected and tabulated fifty-five. All cases that followed abortion have been excluded. The remainder are classified into three periods, the premenstrual, menstrual, and postmenstrual or interval cases. All cases of severe alterations of the adnexa and parametrium are excluded. As a result of the examination of the tables he finds that, aside from physiological variations in the form and number of the uterine glands, there is a true glandular hyperplasia and hypertrophy. From these result abnormalities of secretion. This must be recognized when there is a progressive process going on in the glands; when there is production of cysts and invaginations; and when we find gland forms in the premenstrual interval. Signs of importance are inflammation of the plasma cells, and changes in the spindle cells and connective-tissue cells. If we find hyperplasia and hypertrophy of the glands combined with inflammatory changes, or the remains of such changes in the stroma, there is no reason why we should not make the diagnosis of an inflammatory origin of these lesions. For these cases the name *endometritis glandularis* is appropriate. The pathological significance of such changes is not to be denied.

ITEM.

POSTOPERATIVE SEPARATION OF LAPARATOMY WOUNDS.

This diagram, which illustrates the shelving inward of the deeper layers of the abdominal wall after separation, should have accompanied Dr. Ries' paper in the October JOURNAL.

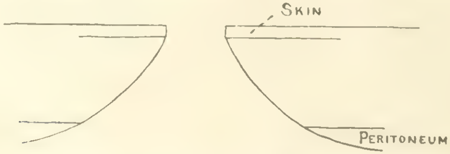

FIG. 1.—Diagram illustrating the shelving inward of the deeper layers of the abdominal wall after separation (in transverse section)

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

SOME IMPORTANT BUT OFTEN NEGLECTED FACTORS IN INFANT-FEEDING.

BY
THOMAS S. SOUTHWORTH, M. D.,
New York City.

WHAT may with justifiable pride be called the American method of infant-feeding has been developed so rapidly within the past decade, by the improvement of older methods and the incorporation of new, that it seems worth while to consider some of the factors which unnecessarily militate against its successful practice. Certain it is that while the careful student of the subject, whether specialist or general practitioner, finds the indications for the necessary changes in an infant's food clearer than before and his resources for intelligent adaptation vastly increased, many of our profession are still grasping at the shadow and missing the substance. Much of this failure and dissatisfaction, if one may judge from the histories of cases coming for the first time under one's care, is due to a neglect of basic principles or, one is tempted to say, to a failure to play the game according to the rules.

While this statement applies especially to artificial or bottle-feeding, we should be faithless to our trust were we to consider successful bottle-feeding as great a victory as successful feeding at the maternal breast. The conscience of the nations has of late been slowly aroused by the alarming decrease of maternal nursing and the unwarranted frequency of early weaning. For this unhappy state of affairs it is to be feared that our profession must bear a fair share of the responsibility, because until very recently we have devoted but little attention to the problem of enabling the mother to nurse her infant.

A usual history of such cases is that the infant cries supposedly from hunger, that its stools are misinterpreted as showing either a lack, or a disagreement, of the mother's milk, and that without regulation of faulty nursing habits, without accurate observations of the infant's progress in weight and without proper attention to the mother's diet and health, the ready-made diagnosis of others is accepted, the breast abandoned, and without fair trial the infant condemned and sentenced to bottle-feeding. While the infant of well to do parents who can afford the best medical supervision may by good fortune and under the most favorable circumstances progress apparently as well upon the bottle as if fed at the breast, no physician needs to be reminded that in the community at large, and too often in the home of the rich, the chance of life and of normal uninterrupted bodily development is much smaller for the infant brought up on the bottle.

Consideration of the subject of breast-feeding *versus* early weaning, must be confined in this paper to a few brief axiomatic statements:

Supervision of breast-feeding, especially when the nutrition of the infant is under suspicion, cannot be properly conducted without frequent determinations of its exact weight.

Only in those extremely rare instances where there is no secretion from the breasts is it possible to determine with certainty before the expiration of ten or more days whether the infant may not subsequently thrive at the breast, since gains in weight often improve when the mother is out of bed, and has regained her health.

Crying may have many causes and is not a reliable indication that the infant is not getting enough milk.

Green, or loose, or scanty stools in a newly born infant are often coincident with regular gains in weight. They are frequently due to physiological conditions, or favored by irregular nursing, and by no means indicate of necessity that the milk disagrees with the infant.

When the stools are scanty and the weight stationary or the gains slight, suitable supplementary feeding may be advisable until the breast milk can be improved.

Early and sudden weaning should never be advised for an infant of stationary weight until every effort has been made to improve conditions by proper nursing hours, regulation of the mother's health and hygiene, and trial in her diet of milk and of yellow corn-meal gruel.

An apparently disturbed infant who is steadily gaining, or has recently gained well, at the breast, should not be weaned until all the factors in the disturbance have been thoroughly investigated, as the probabilities are in favor of successful continuation of lactation.

On the other hand, an infant at the breast who seems well and contented, and has good stools, should not be allowed to long stand-still in weight or to make insufficient gains for the lack of some supplementary artificial feeding. This holds true not only during the first few weeks but at any period of lactation.

There is no incompatibility between cow's milk and breast milk given at different feedings, or at the same feeding. Properly adjusted, supplementary feedings accustom the infant to the digestion of cow's milk and increase the ease and safety of subsequent weaning, should this become necessary.

We must now turn to the consideration of bottle-feeding. When this for sufficient reason is the only course open to us, there is less difficulty than formerly in starting the new-born infant upon artificial feedings. High proportions of milk or top milk in the feeding mixture are no longer given at the start, for we have learned that the milk of a foreign species which is not biologically adapted to the digestion of the infant must be begun gradually and its strength steadily increased. The recent realization that it is the fat of cow's milk which causes much of the indigestion of infancy has been a long step in advance, but has yet to receive general recognition and application. Infants require fat, usually more than is contained in simply diluted cow's milk, but it must be given them intelligently and cautiously. Colic is probably more often caused by fat than proteid, and the same is true of soft, curdy, abnormal stools. Only a limited number of infants can take a mixture in which the percentage of fat is three times the proteid. If such a three to one mixture upsets an infant, there is trouble in getting it righted again. The longer it has been persisted in the harder the task. Those babies who have long been experimented upon with high fat percentages are often those who are declared to be unable to digest cow's milk. It is usually safer to begin with the fat percentage not over twice that of the proteids, and push up the strength if it is well borne.

Proteid is necessary to growth, and proteid in larger quantities can be managed if the fat is not so high as to disturb. This does not mean feeding diluted plain milk, which has been tried since time immemorial and fits only a certain number. When diluted plain milk is given to a young infant by the laity and by many physicians, half milk and half water is the most common starting-point, and when—as is usually the case—the infant is given at short intervals all of this that he will take, the experiment ends in disaster. The next step is usually a rapid course of all the different infant foods, some one of which may occasionally hit the mark, not because it is primarily a better food for the infant than fresh cow's milk, but because it happens to avoid the gross errors of his previous diet.

Much unnecessary trouble would be avoided if it were always remembered that as the strength and quantity of the milk mixture are increased the interval between the feedings must be lengthened to allow of complete digestion. No amount of insistance upon the right intervals and the proper quantities in infant-feeding seems to force the importance of these factors upon many of our profession. Many infants, it is true, will tolerate all sorts of lapses and irregularities, but the difficult cases will not. If I could feel sure of having impressed proper intervals and proper quantities upon a group of medical graduates, I believe they would have greater success with infants than any similar group whose attention had been wholly engrossed by the refinements of infant-feeding. Both without and within the hospitals, I am constantly finding infants who are making no gains upon suitable formulas, for the sole apparent reason that they have been overfed in quantity, their stomachs systematically overfilled, and their digestive powers consequently overtaxed; frequently, also, their meals are given too close together, and their stomachs have no time for rest and recuperation. Frequent night feeding should be condemned in this connection. Even if marked digestive disturbance does not result, energy goes into the quasi digestion of these excessive quantities of food that should be conserved and directed into the proper channels of growth.

These overfed or too frequently fed infants are indeed "difficult cases." Happily, some of them respond promptly to the cutting down of the quantities and to giving them time between the feedings to empty their stomachs. But many of the others, especially if the errors have been long continued, respond much more slowly. We are dealing with a type of starvation which may arise from over-feeding as well as from under-feeding, and is much more difficult to treat.

When one undertakes to regulate the feeding of so-called difficult cases that have been overfed or excessively fed, there is very often a slight temporary loss of weight at the outset, when the changes are inaugurated. Part of this is due to clearing out of the excessive food residue in the bowels; part also to reduction in the amount of fluid given. Such initial loss of weight disturbs the laity, and often the physician. The overfed infant who has been unable to absorb enough of his overabundant feedings to gain in weight, misses the extra quantities and continues to cry. The mother must have it explained to her that until the digestion regains its balance and the proper power of absorption is reestablished the infant will be neither quiet nor contented.

Next to gain in weight, the best indication of approaching success is improvement in the stools. This estimation of the diagnostic and prognostic import of infant stools in feeding cases has always been a difficult matter, owing apparently to faulty criteria. Many stools of good or negative import are popularly considered to be poor stools. Conversely, and as often true, a stool is considered a good stool because it has a yellowish color and is fairly smooth, which to the experienced eye is a poor stool. Among these are the soft yellow and pale constipated types of high fat, the alkaline stool of proteid decomposition, and the stools of starch indigestion where the cereal element in the food is in excess. Unhappily stools, like skin eruptions, cannot easily be described so as to be recognized. They must be seen and studied.

In some of the difficult cases, overfed infants have become so disturbed that they do not readily improve upon the same kind of food, even with properly modified and limited feedings. Some of these do better for a time with a change of food, not a haphazard groping for something which is merely different, for this it is which leads to the blind use of several patent foods in rapid succession, each of which may leave the patient in worse condition than before. We must study the history of the previous feeding, discover its errors, analyze the infant's symptoms, inspect and draw inferences from its stools. Then only may a change of food be intelligently chosen to meet definite conditions, with a clear idea of what one wishes to accomplish, and confidence to continue it long enough to secure results or prove its inadequacy.

It is in such cases where too high a fat percentage or inability to digest a more moderate one has caused the disturbance that substituting the malted preparations, and particularly malt soup mixtures, is often most promptly successful, because they furnish easily assimilable elements while sparing other digestive functions which have been overworked to the point of exhaustion. Absorption is possible of the food elements in the new and different form, where before it was impossible. In the meantime, the intestinal reaction is changed, inimical bacteria die out in the altered medium, and the bowel regains its tone. When with increased absorption of nutriment suitable gains in weight have been reestablished, a return to proper formula of cow's milk should not be too long deferred, and may be begun with reasonable hope of success.

It may be said in this connection that it would be a misfortune if the wave of foreign influence which is beginning to be felt in this country should obscure, even temporarily, the inestimable advantages of percentage feeding. This brilliant advance upon older methods, which had its birth in this country and belongs exclusively to no section of medical faith or practice, rests, when stripped of externalities, upon the simple principle of fitting the food to the peculiar requirements of the individual infant. Its great merit lies not only in enabling the physician to make such adjustments, but, when they *have* been made, to know exactly what he has done. With this instrument of precision, clinical experimentation has established certain principles applicable to the infant at different periods of his growth, but requiring in their application sound judgment and adaptation to circumstances. It would now be nothing short of a catastrophe were we to turn our backs upon this cumulative experience and begin again feeding all babies with a single mixture, or even two mixtures, because these succeed in some cases and because they come to us with a foreign endorsement. This is the flaw in the continental butter-milk mixture, and even in the malt soup mixture, valuable as the principle of the latter is proving itself to be when incorporated with our hard-won knowledge of percentage methods. We should borrow freely any principle which is an advance, but let us not revert to errors from which we have emerged.

A great deal of the ill-success in infant-feeding arises from a failure to discriminate between the normal infant and the sick infant. In the group of normal infants I place those who have had no difficulty in taking cow's milk and making proper progress upon it. They may be fed in various ways with success. Moderate errors in feeding do not disturb them. Such children are raised successfully under the supervision of the physician, but also by parents and nurses who follow the stock rules of any good nursery guide. If all infants were like these the last word would have been said about infant-feeding, because percentage feeding schedules would have solved the problem.

Unfortunately, however, some of these infants fall sick in a variety of different ways, and the food which they could previously take without trouble now fails to be properly digested. If the simple plan were always followed of reducing the strength of an infant's food one-half upon the first appearance of fever or other disturbance, and gradually increasing it again as the infant improved or recovered from the first shock of the illness, the sum-total of digestive disorders would be greatly lessened. Parents and nurses have not been properly instructed on this point, possibly because the patent food circulars by which they have been educated fail to mention it, but the physician who himself forgets to advise it is chiefly responsible. Many men who would never fail to place a sick adult upon fluid or semi-solid diet, do not realize that an equivalent reduction is necessary for the sick infant, or that for a child in its second year merely cutting out other food and leaving it upon whole milk is not a sufficiently light diet for an acute illness.

But infants who are acutely ill do not comprise all of the class which cannot digest those stock formulas which are based upon age alone. Every infant who has failed to thrive upon artificial feeding, and every infant who must be weaned during the first year belongs to this group, and is not to be expected to digest at once the same formula of cow's milk which a normal infant of the same age fed artificially from birth has gradually accustomed its digestion to care for. Could this fact be clearly comprehended at the outset by every practitioner who essays to feed babies, we should have less complaint of the failures of percentage feeding.

Bottle-feeding should be our last and not our first resort. When found to be absolutely necessary it should, when possible, gradually displace the breast. The first step in artificial feeding is to secure perfect digestion of a weak milk mixture which is reasonably certain not to cause disturbance, and to so time our changes as to increase the strength neither too rapidly nor too slowly. Due regard for proper quantities and proper intervals outweighs in importance ultra refinements in decimal percentages. When the infant is steadily gaining we should not be in too much of a hurry to increase its food, but when the gain slows down or ceases we must carefully investigate the cause and determine whether the evidence calls for an increase or a decrease in the food strength. We should remember that sufficient proteid is the foundation for a well-balanced development, and that more proteid may be given to the average infant over six months of age if the fat does not exceed 2.50 per cent., or at the most 3 per cent., and also that well cooked starch in some form is readily digested and absorbed after the seventh month, and is more successfully given combined with the milk mixture than in any separate form.

Much of what this paper has contained may have seemed trite and too self-evident to have warranted repetition, but if these much too common errors have been presented in such a form as to lead to their more scrupulous avoidance, greater success will attend our efforts in this most important field of practice among children.

807 Madison Avenue.

THE TREATMENT OF TYPHOID FEVER IN CHILDHOOD.

BY
LEGRAND KERR, M. D.,
Professor of Diseases of Children in the Brooklyn Post-Graduate Medical School; Visiting Pediatrist to the Methodist Episcopal (Seney) Hospital, the Williamsburgh, and the Swedish Hospitals in Brooklyn, N. Y.; Consulting Pediatrist to the E. N. Y. Dispensary, Brooklyn, N. Y.

Before taking up definitely the treatment of typhoid fever in young children, I am compelled to speak briefly of the diagnosis because of a firm conviction based upon clinical experiences that the disease is much more prevalent in childhood than is commonly supposed. Because of the fact that the disease in childhood runs a much shorter and milder course than during adult life, and because the application of the aids offered by the laboratory are not always taken advantage of, the disease is frequently "overlooked." If all of the cases which are diagnosed as tuberculosis, pyemia, influenza, malaria and gastroenteritis were subjected to the simple procedure of a Widal blood test after the first few days of their persistence, and repeated examinations made, many such cases would be recognized as typhoid fever.

The treatment might well be divided into prophylactic, dietetic, hydrotherapeutic, hygienic, symptomatic and special.

The prophylactic treatment is largely relegated to those who have authority over the water and milk supplies of the communities. In some instances this supervision extends to other food supplies (shell fish, etc.). But for practical purposes we are concerned with household prophylaxis. And the *first* consideration in the home is to isolate the patient. The *second* is to adequately disinfect the discharges from the patient and all that comes into contact with him. It is this second consideration of which we will speak most fully because while there seems to be no disposition to disregard disinfection there is not a due regard for "adequate" disinfection. I shall briefly speak of several of the more commonly used agents and their results.

There is no question that of all means to destroy the probability of infecting others, fire is the best agent, and whenever possible to use it in the destruction of articles of little value, this should be recommended. Dry heat is far inferior to fire because it must be applied for at least one hour to be effective and it does not penetrate to the interior of the articles which are subjected to it. For this reason it is apt to give a false sense of security and of duty done. Steam under pressure (fifteen or more pounds to the square inch) is most efficient, but if applied at atmospheric pressure it hardly equals boiling water as a disinfectant. Boiling in water is certainly a most efficient measure and is easily carried out in the home. The disinfection of the stool and urine is most important. For the stool, lime may be used but must be in equal amount to the stool to be effective unless the chloride of lime is used which is much more powerful. A 5 per cent. solution of carbolic acid is good but has the disadvantage of a disagreeable odor, and its place is admirably taken by a 1-500 solution of corrosive sublimate.

The disinfection of the urine is accomplished in two ways; by the ingestion of hexamethylenamin (urotropin), and when voided by a direct contact with a 1–500 solution of corrosive sublimate.

Even in the application of these methods to the stool and urine it must be recalled that such contact must be for a long period (one to two hours). It will be thus readily seen that the ordinary method of cleansing the vessels and utensils used about the patient, with a cloth wet with such a solution is precautionary and to be commended, but at the same time is far from offering the protection which it is the right of the uninfected individual to demand. For the bedding, etc., a two-hour contact with 1–1000 solution of corrosive sublimate or a 5 per cent. solution of carbolic acid (phenol) is efficient, although a few minutes' immersion in boiling water is equally so, and much more likely to be carried out.

For disinfection of the child's person, we are limited to the use of a 1-3000 solution of corrosive sublimate. For the attendant we may use this latter solution or a 2 per cent. solution of carbolic acid. Carbolic acid is too irritating to a child's skin. Less irritating solutions should be used freely in the nose, all through the illness. Disinfection should be continued until two weeks after a normal temperature has obtained or until the bacilli disappear from the excretions.

The Dietetic Treatment.—Children stand starvation diet badly; it has no place in the treatment of typhoid fever. Even under the most favorable conditions there is bound to be a loss of energy, and unless the nutrition is sufficient for all of the child's needs there will occur a considerable loss of weight. An exclusive milk diet far from meets the demands. There must be supplied to the child food which will give enough energy and allow of sufficient variety to aid in keeping him in good resistant condition. The most satisfactory method is to remove the top pint from a quart bottle of milk and dilute it with one pint or less of boiled water. In children under five years the dilution of pint and pint is best, but in older children it is better to allow the cream to remain concentrated and dilute the pint with eight ounces of water. To each ounce of the milk so treated there is added from one-half to one dram of sugar of milk. This latter is a most valuable addition to the diet. In the administration of food regularity must be the keynote. It is not sufficient that we prescribe a certain amount of nourishment every so often, but there should be some definite idea of the needs of the child.

For practical purposes this may be best calculated by the weight of the child.

We may proceed somewhat as follows: There should be provided such an amount of food as approximates the caloric need of a child at rest with a further addition to prevent as well as limit protein loss. For every five pounds of the child's weight, we should provide in each twenty-four hours approximately:

Milk (treated as suggested) 2 1/2 ounces.
Sugar of milk 1 1/4 to 2 1/2 drams.
Eggs (raw) 1/2.
Cereal gruels 1 to 1 1/4 ounces.

To illustrate: a child of fifty pounds would be given (in twenty-four hours) milk, 25 ounces; sugar of milk, 12 1/2 to 25 drams; eggs, two to three; cereal gruels, 10 ounces.

But to add to the variety of this as well as adding an extra amount of nourishment which is easily and usually eagerly taken, I am in the habit of using vegetable purees in the milk. The puree is made from any fresh vegetable which is cleaned and cut fine, and covered completely with cold water. This is boiled for from four to six hours and strained. Then the clear liquid is reboiled for five minutes, restrained, seasoned and thickened with arrow root. This is used as a stock, and is added to the milk in about the proportion of two ounces to eight. By varying the vegetables the appetite is appealed to. Water should be given somewhat freely and at stated intervals, although it needs to be remembered that with the milk treated as suggested, there is considerable amount of water added to the diet. As soon as the temperature has remained normal for five to seven days solid food may be added in the form of stale bread, zwieback, toast, or a well-cooked cereal. The return to a full diet can be made more rapidly than in adult cases. The return to a whole milk in the dietary should be made with considerable caution because there persists for a long time an intolerance to it.

The hydrotherapeutic treatment cannot be used as in adult cases, because many of the methods are unsuited to children.

For the pyrexia the cool pack may be necessary, but in most instances sponging with tepid water will be all that is required if the child is not dried after its use. The cold bath should be mentioned only to be condemned as unnecessary and harmful.

Sponging should be done for several minutes (fifteen to thirty) every three or four hours, unless it irritates the child. In this latter case, the cool pack may be used as less exciting to the little one. But the height of the temperature is not the only guide to the necessity of this form of treatment because children differ remarkably in this particular, and the indication for a reduction of the temperature is the effect which that temperature is having upon that particular child. As a general rule, however, a temperature under 103.5° F. may be regarded as not requiring special attention in the average child.

The Symptomatic Treatment.—We refer to "symptomatic" rather than to "medical" treatment because it is rarely necessary to give medicines except to control or influence some special symptoms or to limit or prevent some complication. In other words, there is no "medical" treatment of typhoid fever in infancy or childhood. Symptoms must be treated as they arise. Naturally much of this would come under the head of treatment of special symptoms and complications (to which the reader is referred).

The hygienic treatment involves much of the prophylactic care but irrespective of that there are certain special features which must be considered. The care of the mouth must be rigorous. Every precaution should be observed, particularly through frequent and thorough cleansing with a mild antiseptic solution (as saturated solution of boric acid). At the first indication of a break in the continuity of the mucous membrane, the vigilance must be doubled to prevent complications (ulcerative stomatitis, gingivitis, or cervical lymph node infection). And I must emphasize the need of special care of the genitals, for neglect of this region will do much to make convalescence marked with symptoms of irritation and restlessness. Of course, much that has been considered under prophylactic treatment will apply here.

THE TREATMENT OF SPECIAL SYMPTOMS AND COMPLICATIONS.

Vomiting usually indicates that the food is not being well taken care of, and in that case a complete withdrawal of food for a few hours will relieve it. Ice may be given freely, or small quantities of orange ice. Teaspoonful sips of very hot water or of a cold carbonated water are grateful methods to relieve the child. The return to the former diet should be gradual and guarded.

Headache does not usually demand treatment, although at times it may become a marked feature of the disease. Ice locally (ice bag) gives the desired relief as a rule, although it may be necessary to administer small doses of the bromides.

Constipation is best relieved by an enema of one pint of water containing one ounce of magnesia sulphate and two ounces of glycerine introduced just inside of the rectum (and not high in the bowel). Laxatives are usually unnecessary, but if used preference should be given to citrate of magnesia or the milk of magnesia.

Diarrhea may call for treatment if the stools exceed four in twenty-four hours. Sometimes it is due to an excess of fat in the food or an excessive quantity of the food itself, and in such instances the indications are clearly for a reduction in the offending element. If drugs are necessary, opium holds first place, and in combination with subnitrate of bismuth its dose may be very small (child, four years; pulv. Doveri, gr. i, bismuth subnitr. grs. x every two or three hours). Care must be exercised not to *produce* constipation.

Tympanites is an early feature of typhoid in children and must be anticipated. It is best reduced by the regular occurrence of two to four stools a day.

Not infrequently a dietetic fault will aggravate it, and its dietetic management is quite similar to that of diarrhea—a reduction of the food or one of its elements.

Abdominal stupes I have found of no avail. Permanent relief must come through regulation of the diet.

The Heart.—If its action becomes rapid as the first sign of cardiac weakness, the tincture of strophanthus should be used (child of five years; two drops every two or three hours) and if there is irregularity in its action, this demands the use of strychnine (child of five years, 1/200 grain every three hours). The use of alcohol as a routine measure is harmful in children as well as unnecessary. Alcohol occupies an important place as a stimulant to tide the child over those cardiac crises which may occur, but its use should be reserved for such instances. Used with nitroglycerine (whisky 2 drams, nitroglycerine 1/250 grain to a child of five years) it is one of our most certain aids.

Hemorrhage is a rare accident. Personally I have never seen its occurrence in children. Its control would be by absolute rest (mental and physical), a marked reduction or complete withdrawal of the diet, the application of the ice bag to the abdomen and the hypodermic administration of opium. Hot saline enemata or normal salt solution subcutaneously might be indicated when the loss of blood was large.

The management of the various complications which may occur is upon the same general principles of treatment as applies under other conditions. The presence of typhoid does not modify those principles. The complications which occur in the adult cases are rarer in childhood.

42 Gates Avenue.

THE MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Meeting of October 25, 1909.

The President, H. SEYMOUR HOUGHTON, M. D., *in the Chair.*

BIOLOGY AS THE BASIS OF INFANT FEEDING.

DR. HENRY DWIGHT CHAPIN, in studying the literature of infant feeding, found it most unfortunate that a common standard was not employed. In one country the calorimetric basis was advocated; in another, stress might be laid upon the percentage composition of the food; in another, efforts at a solution of the problem took the form of chemical manipulation, such as the addition of citrate of sodium to cow's milk, and some laid great stress upon adjusting the proportion of casein and albumen in the food or upon peptonization. Infants had been fed more or less successfully by all the methods that had been proposed, but careful analysis showed that other factors than those given prominence had often been involved in such success. The problems of infancy belonged to the science of biology or the science of living things, and not until infant feeding was treated from this standpoint could there be a common ground for teaching and discussion. If the subject was approached from the standpoint of biology, it became simplified at once and a great many points were removed from the field of discussion and controversy. Biology showed that all living matter was composed of protoplasm which was more or less complex and differentiated into tissues. It was also well known that all animal life demanded protein in the food to form new protoplasm and to replace metabolic waste of protoplasm. It had also been clearly established that there was a constant expenditure of energy whose waste product was heat, and that for carrying on the processes of life energy-containing food was also necessary. At birth the milks of different mammals could be made interchangeable for many individuals of the young of various species, and as far as nutritive value was concerned they were often fairly satisfactory substitutes for each other. But at the end of the natural suckling period of many mammals no such interchange of food would be possible. An important matter that seemed to have been generally overlooked in infant feeding was that milk was a food for a digestive tract that was constantly changing its form and function, and the differences in the digestive properties of milks of various species were for specific purposes. The milk of herbivorous animals whose digestion was principally gastric formed curds that could not easily leave the stomach; the milk of herbivorous animals whose digestion was principally intestinal formed gelatinous curds which easily left the stomach and passed into the intestine; woman's milk which was intended for a digestive system in which gastric digestion was more than that of the horse or ass, but not so great as the cow or goat, curded in flakes that stood between the other two types of curds. Biological science showed, then, that while a certain amount of protein was present in the milk of all animals and was necessary for tissue building and growth, this protein must not only be coagulable, but must curd in a *certain specfic way* in each species of animal.

From a biological standpoint the main points to be considered in infant feeding are: a sufficient supply of proteins to permit the production of new tissues; enough energy food to supply the necessary amounts of energy to carry on the vital processes, and the adaptation of the form of food to suit the peculiarities of the individual infant. In recapitulation Dr. Chapin said that neither biochemistry nor the question of the heat-producing power of food nor the quantitative manipulation of the ingredients of various milks could form alone a broad enough basis for scientific infant feeding. They might all be employed, but must be subordinated to their proper place by biology. This science, however, must always put the emphasis on growth as the largest factor in early life. It likewise for the first time in the history of this question considered the developmental as well as the nutritive functions of milk in connection with the evolution of the particular digestive tract it was intended to serve. Along this same line it would incidentally show how far various milks were interchangeable and suggested methods of making them so.

THE QUESTION OF CLEAN MILK.

DR. WALTER LESTER CARR said that while sterile milk was not always easy to obtain, it was now recognized that there were sources of contamination that might be avoided, as the changes that took place were principally due to bacterial growth. The bacteria that occasioned these changes were of two kinds—the pathogenic or disease producing, and the nonpathogenic or nondisease producing. In considering the contamination of milk by bacteria, they must appreciate, therefore, these two classes of bacteria and sources by which they enter the milk. They were: 1. bacteria from the cow; 2. bacteria from the milker and his utensils; 3. bacteria from the air. Bacteria from the cow might be caused by constitutional disease or local sources of infection. A cow might have general tuberculosis with foci in the udder or the foci might be present without apparent changes in the system. Not only did the milk ducts serve as channels of infection, but the hair and skin might harbor myriads of bacteria. The milker and his utensils might increase bacteria in the milk in a variety of ways. He might have soiled hands or a sore throat with cough or he might wash his pails and cans in contaminated water. The invasion by bacteria in the air was observed when milking was done in barns where loose hay and dust were found. The question of clean milk was to produce milk under the best possible conditions of dairy hygiene, handling, cooling, and shipping. Included in the first was the necessity for healthy cows. Certified milk was inaugurated in New Jersey in 1893 and in 1900 in New York County through the activity of Chapin and others. At present there were over fifty milk commissions in the United States endeavoring to improve dairy conditions and the production of milk. Some important requirements of the Milk Commission, the testing of cows for tuberculosis, the clipping of hair around the udder, etc., the grooming of cows, prohibiting feeding and bedding immediately before milking, cleanliness of the milker and of his utensils, rapid cooling of the milk, and its shipment in sterile sealed bottles for immediate delivery, were accepted as part of an ordinary routine for all bottled milk. The question of clean milk resolved itself into the oversight of dairies and milk so as to provide the safest substitute for mothers' milk when this was not obtainable. Certified milk as produced under the guarantee of the Medical Society of the County of New York was the best milk because it was the cleanest and freshest milk brought to the city.

PASTEURIZATION OF MILK.

DR. ROLAND G. FREEMAN said all agreed that what was wanted was a safe raw milk, since they all wished, in the artificial feeding of infants, to approximate as nearly as was feasible the condition of the food as obtained by the infant at the breast. The only questions for discussion, then, were: Could they obtain a safe raw milk for the feeding of infants, and if not, was milk injured by heating, and to what extent, and by what temperature? The danger of tuberculosis in milk might be said to be fairly eliminated by well-aired, well-ventilated cow stables and by repeated tuberculin tests. But tuberculosis was one of the lesser dangers in milk. The diseases concerning the spread of which they had most tangible and incontrovertible proof were typhoid fever, diphtheria, scarlet fever, and epidemic sore throat. He thought they might well say at the present time that there could be no absolute security in any raw milk. This being the case, why should they not use a heated milk in which there was security? Commercial pasteurization, which consisted in heating milk to a high temperature for a few seconds, should be condemned. It was used for the purpose of keeping dirty milk sweet until it could reach the consumer. Such milk should be poured into the gutter and not allowed to be sold as pasteurized milk.

The only safety for the consumer was to get his milk sweet and raw, and having obtained it he should render it safe by the use of the smallest amount of heat compatible with safety. Dr. Freeman gave the following conclusions: 1. There was no absolute safety in any raw milk. 2. Commercial pasteurization of milk used to keep it sweet until it could be marketed should be condemned. 3. Milk was in no way injured by pasteurization at 140° for forty minutes either in taste or by chemical change or action on ferments. 4. Pasteurized milk did not cause malnutrition or scurvy or rachitis.

THE PERCENTAGE PRINCIPLE AS APPLIED IN INFANT FEEDING.

Dr. Henry Koplik said the percentage principle in infant feeding had its origin in an effort which had been for decades uppermost in the minds of physicians to feed infants with a substitute for breast milk approaching it in chemical composition. From earliest times the percentage method was the first weapon chosen by those who felt the need of something more than simple dilution of whole milk to meet the needs of the infant deprived of the mother's breast. In 1892, Dr. Rotch, of Boston, read his first paper before the American Pediatric Society upon milk laboratories in which he elaborated a system of infant feeding, the so-called percentage, or American, system. To carry out his ideas, Rotch advocated the so-called milk laboratory in which the cow's milk was separated into cream and skim milk, and then reconstructed into definite formulæ, which were given the infant. Rotch and his pupils, having discovered difficulties in the digestion of the proteid, had elaborated a second method of so-called split proteid feeding; that was, the proteid of the milk was split into the caseinogen (curd casein) and lactalbumin and recombined. The intelligent use of the percentage method must presuppose a knowledge on the part of the physician of the effect of the various percentages of fat and proteid on the infant. The teaching of the percentage method was that the physician must begin with a low percenage of proteids fully 0.5 of 1 per cent. in the newborn infant, and as the infant reached the end of the first month, the percentage was increased to 1 per cent. The digestive power of the young infant in the first month was considered low or difficult for the proteids of cow's milk. The new-born infant would digest 2 per cent. of fat, and a few weeks after birth 3 per cent. of fat. The sugars were given in 5 per cent. to 7 per cent. mixtures. Though the percentage system had been a great teacher of food percentages, it had not materially aided their knowledge of the physiology or the physiological chemistry of infant feeding. The insistence of the advocates of percentage feeding upon a low proteid percentage for early infancy was met with positiveness by well-known men who could not see that the old theory of indigestible curds of casein of cow's milk had at all been proven. According to them, there was no one symptom in all the gamut of symptoms of nonassimilation in artificially fed infants which could be traced to the proteids.

On the contrary, they pointed to the great tolerance of the youngest infant for high proteid percentages, as seen in buttermilk and malt-soup mixtures. The large degrees of disturbances were due to an intolerance of infant digestion to the fats of cow's milk. The percentage method of infant feeding had simply given the physician a means of obtaining a food for the infant accurately put together. It had shown him that he could give to young and old infants certain percentages of proteids and fat. A woman's milk not only varied from day to day in composition, but from hour to hour, and still the infant throve. This should teach that the kernel of infant feeding did not lie in the percentages, relative or otherwise, of the proteids and fat in the food, but in the nature of these proteids or fats. In closing, Dr. Koplik said it was the individual that the physician was called upon to feed after all. Else how could they explain the fact that, given two infants fed on the same breast, one would thrive, the other would not. He felt that the percentage principle was an instrument to an end. This end must be obtained through a thorough knowledge of the physiological chemistry of infant feeding.

THE FEEDING OF INFANTS DURING ILLNESS.

Dr. Linnæus E. La Fetra limited his paper to children under the age of two years. He discussed, first, the physiological and pathological action of foods and, second, the effects of fever on digestion and metabolism.

Physiological and Pathological Action of Foods.—To be assimilated food must be digested; to be digested it must be brought into solution or fine emulsion; it must therefore eventually be either in minute subdivision or in liquid form. Any food, if partaken with relish, tended to promote the secretion of the exact sort of digestive juice suited to the food. Water was the basis for the secretions and excretions and was the most important of all the foods, being the universal solvent. The salts of the organic acids increased the alkalinity of the blood and increased its bactericidal power. Proteids were the blood makers and tissue builders. The proteids mainly used in infancy, given in the order of their digestibility, were those of breast milk, of cow's milk, eggs, meat, and vegetable proteid. If carbohydrates fermented in the stomach they gave rise to gases and irritating members of the fatty acid series; eructations and vomiting might result. Excessive carbohydrate feeding produced great flatulence, with eructations, distention, and diarrhea. The chief advantage of the carbohydrates was that they were readily absorbed and were quickly available for energy in the liver and muscle cells as glycogen. They were readily changed into fat and they also acted as proteid sparers. Fats had certain properties that rendered them difficult of utilization by sick infants. They retarded the secretion of gastric juice; if fermented there, they produced irritating acids. If in excess in the intestines, they mechanically interfered with the digestion and absorption of proteid and drew upon the fixed alkali for neutralization of their fatty acids. Thus they tended to diminish the alkalinity of the blood.

The Effects of Fever on Digestion and Metabolism.—The chief effect of fever here was a destruction of the tissues, the proteids suffering more than the fats; glycogen was likewise rapidly used up. From a consideration of the effects of fever on digestion and metabolism, it was evident that water in the food was of the first importance. In short attacks of fever it was the only necessary food. It was of the greatest service in cases of acute diarrhea to help wash out the bowels and to prevent relative desiccation of the cells. Food should be given in liquid form. The carbohydrates should be given in as large quantities as could be well tolerated. They should be given preferably with proteids. Fats should be used sparingly. Milk was the easiest of the complete foods to be assimilated; whole or skimmed milk should be preferred, and this should be combined with a carbohydrate gruel or sugar and either peptonized or acidulated.

Gastrointestinal Disorders and Diseases.—In cases of anorexia without fever, if breast-fed, lengthen the intervals between the nursings, and give water before the nursings. If artificially fed, diminish the number of feedings and give less and weaker food. Vomiting when there was no fever was probably due to too large feedings or too frequent or too rapid nursing. The indications were to lessen the time of nursing and lengthen the intervals. Fats and sugars should be reduced. If the child was breast-fed, the mother should take more exercise, drink more water, and lessen the quantity of meat, eggs, and milk consumed. Acute gastritis was very rare in infants. In jaundice vomiting was not apt to be a marked feature after the onset, so that usually feeding by mouth was possible. Fats should be avoided. Whey, buttermilk, or skimmed milk mixed with dextrinized cereals should be given at first; later whole milk and cereal gruels. In enterocolitis foods that were digested and absorbed high up in the alimentary tract should be given; also those that left little residue. Cases of colitis should be managed much as cases of enterocolitis, but a larger amount of proteid and carbohydrates could be utilized. In cases of diarrhea the number of feedings should be reduced to the lowest possible point. Animal broths and peptones excited peristalsis and should be avoided. Malted foods should be used with caution. The breast-fed baby was seldom constipated unless the milk was failing; in such cases toning up the mother or supplementary feeding would correct it. In bottle-fed infants the amount of fat might be cautiously increased. In typhoid fever water given with regularity was very important, Plain milk, peptonized milk, buttermilk, or ripened milk should be the basis of diet. Along with the milk should be given gruels or gelatin. The caloric requirements should be kept constantly in mind and approximated as nearly as possible. Many of the late symptoms of typhoid were undoubtedly connected with starvation. In pneumonia their main object should be to furnish abundant water and alkalies and to prevent abdominal distention. A water diet was best for the first two or three days; then whey or milk and cereal gruels, dextrinized or peptonized. In all suppurative processes one should be careful to give as much proteid food as could be cared for. In the exanthemata, water was of prime importance. Meat extracts and alcoholic preparations were contraindicated. In diphtheria peptonized milk, beef juice and gruels should be used and all should be given as warm as possible. In mumps tasteless liquid food should be preferred, such as gruels made with milk or diluted milk. In whooping-cough the infant should be fed as soon as the stomach was settled after the vomiting attacks; the food should be liquid, since the passage of a bolus down the esophagus was apt to irritate the trachea and induce a paroxysm. Fresh air, the optimum quantity of all of the three great classes of food-stuffs and careful attention to the gastro-intestinal functions were the best that could be done for those suffering from tuberculosis.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of October 14, 1909.

ELI LONG, M. D., *in the Chair.*

PYLORIC STENOSIS CURED WITHOUT OPERATION.

DR. LINNAEUS E. LA FETRA presented a baby, nine months old, the only child of Jewish parents. The father and one uncle had tuberculosis, while two uncles died of the disease. The child was born at full term. He was breast-fed until his admission to the Babies' Hospital. The mother was incompetent to care for her infant. The baby vomited from fifteen to twenty times a day, usually just after, but always between, feedings. It was projectile in character. He was always constipated. There was a constant loss of weight from birth. The peristaltic wave was not noted at first because of the tense abdomen and some abdominal tenderness. The child at first was thought to be suffering from pylorospasm. Four days after admission, June 10, the peristaltic waves were first seen and felt, and they became very marked up to June 30. The waves could be seen across the room, and the thickened wall of the stomach could be picked up between the fingers. Only once had Dr. La Fetra seen any such peristaltic waves in a case other than pyloric stenosis with marked vomiting. This child was a Mongolian, one year old. The mother had noticed a peculiar swelling on the abdomen when the child was given a bath. There was no more vomiting than occurred in other babies. In this child the wave was marked, the stomach was thick, and the artery at the greater curvature could be felt pulsating.

The child presented by Dr. La Fetra was admitted to the hospital when five months old, on June 15, 1909. The stomach was washed out and modified food given. On the day following, he vomited two or three times. On June 21, there was very little vomiting. Sodium bromide, 2 1/2 grains, were given. On the thirtieth, 1 minim of paregoric was added. From the seventh of July the baby was breast-fed, and the same medicines continued. The child vomited every second or third day. On August 4, 2 ounces of junket was given three times a day. There was practically no vomiting. On August 7 the amount of paregoric was increased to 3 minims, and about 1 dram of milk of magnesia was given each night. On August 19 the paregoric was increased to 6 minims, and sodium bromide to 4 grains seven times a day. By September 22 there was no vomiting, and the above medication was stopped. On September 27 the child developed a bronchopneumonia; he had a temperature of from 101 to 103.5° F. for ten days. There was no vomiting. Since October 6 the temperature has been normal, the stools are normal, and the baby only vomiting occasionally.

Dr. La Fetra reported two other cases cured without operation. Also three operated cases, all dying.

Dr. Alfred S. Taylor reported a case of pyloric stenosis that he had operated on for Dr. La Fetra, and presented the specimen of the stomach. The child was six weeks of age, and had vomited persistently from the time of birth. The child was brought to New York City from the far West. The classical symptoms of pyloric stenosis presented in this case. One could feel the hardened pylorus, and the peristaltic waves could be seen and felt with perfect clearness. After a delay of about twelve hours to give the child an opportunity to improve under treatment, it was decided not to wait longer, and that an operation should be performed. The operation was done last August. The operation was slightly different from the one usually described. Dr. Taylor said he had been doing some experimenting with the pylorus, with the idea of adopting a scheme suggested by either Dr. Abbe or Dr. Holt, splitting the pylorus longitudinally through the muscular coat, and then doing a suture similar to that of Mikulicz; by so doing there was no chance of contaminating the peritoneal cavity. The pyloric opening was readily enlarged. When it was decided to perform this operation, because the child was in such a bad state of nutrition, it was thought desirable to do an enterostomy in the upper jejunum, and to feed the child through a tube. The pylorus was easily exposed. The pylorus was hard as an ivory button; its muscle was very thick and friable, the sutures tearing through. Finally a diamond-shaped segment of the pylorus was removed down to the mucous membrane and the wound sutured as above stated. He succeeded in getting a good sized pyloric opening. He then did an enterostomy in the jejunum, sutured in the feeding tube, and sent the child back to the ward. The infant was fed every two hours. On the day following the operation, the child suddenly collapsed and died.

The specimen was secured, showing the great thickness of the pyloric wall. The sutures had held. The lumen of the pylorus was sufficiently large, as large as an ordinary lead pencil, to allow the food to pass through with ease.

DR. CHARLES HERRMAN reported a case of pyloric stenosis cured without operation. The infant was breast-fed, and the mother came to the hospital three times a day to feed her infant, nursing it from one breast. The milk was then drawn from the other breast and given three hours later. In three weeks the child lost one pound in weight. With such a slight loss in that length of time, operation certainly was not indicated. The child soon left the hospital, the vomiting ceased, and the child to-day was improving very rapidly.

DISCUSSION.

Dr. Herman said there was one point in connection with these cases that was worth mentioning; why was it that the symptoms of pyloric stenosis did not appear at or shortly after birth, but after some weeks had elapsed. Westphal had tested the electrical reactions in the new-born, and he had found that these reactions for the first few weeks of life were very much diminished in the peripheral nerves. If the symptoms of pyloric stenosis were dependent upon increased reflex irritability, this peculiarity might explain why the symptoms were not present during the first few weeks of life.

DR. CHARLES GILMORE KERLEY said that the one very important point for consideration in any case of pyloric stenosis was, when was the operation necessary? He had observed three cases of this nature, and all had gotten well without operation. He was inclined to believe that perhaps operation was sometimes performed too early. On the other hand, if the operation was delayed too long, the resulting nutrition made the operation all the more hazardous. He felt that it was a most difficult matter to decide just when the operation should be performed. Because of the high mortality, there should be no interference until it has been demonstrated that the child's condition would be hopeless without the operation. These cases did particularly well on breast milk. All three of the cases had been treated in this way. In two, stomach washing was done frequently and no medication was given.

DR. LA FETRA said in regard to the time for operating in such cases, that one should not operate at all if it was possible to avoid it; but in the case Dr. Taylor referred to nothing but an operation could have saved the baby. In another case the child was breast-fed for weeks, and continued to lose weight. Operation was at last performed, and it was learned that it would have been better had the operation been performed earlier.

AMAUROTIC FAMILY IDIOCY.

Dr. Charles Gilmore Kerley presented a child, eighteen months old, an inmate of the New York Infant Asylum. The early history was somewhat vague. The baby was at one of the homes where they boarded out babies, and where the nurse visited once a month. The child was never bright, never smiled, never appeared to care for, or take hold of toys, and evinced no interest in the surroundings. Because of this they had difficulty in keeping her in any place where they kept these babies. The boarding place had to be changed several times because the people thought the child was sick, or at least was an unnatural child. The child was plump, fat, and the nurse thought she was doing well until September 28. The child was stupid, inactive, and the woman who kept the home asked that the child be sent into the institution; this was immediately done. The child was dull and heavy looking. The pulse was very slow, 55 to 60, besides being irregular. The reflexes were all absent. The fontanel, which was small, was tense and bulging. A lumbar puncture was performed, and two and a half ounces of fluid withdrawn; this fluid was under pressure. This fluid was carefully examined by Dr. Hemmingway and nothing abnormal was found. Dr. Reese was asked to see and examine the child's eyes and a diagnosis of amaurotic family idiocy was made.

DISCUSSION.

Dr. Robert Grigg Reese had examined the eyes of the infant Dr. Kerley had just presented and found the lesions characteristic of amaurotic family idiocy, consisting of a white spot at the macula lutea, twice the size of the optic papilla, with a brownish-red almost circular spot at its center. Hyperacousis was very marked. The ophthalmoscopic picture was due to a degenerative change in the ganglion cell layer of the retina.

Dr. George Dow Scott reported the case of a child twelve or fourteen months of age, passed by physicians as amaurotic family idiocy. The posterior nares of the child was fully plugged with adenoids. The removal of the adenoids was followed by a complete recovery from the pseudo-imbecility.

Cases of cretinism, feeble minded children, and amaurotic family idiocy were very interesting, but one must exercise great care in making a differential diagnosis, which was somewhat difficult at times.

Dr. Godfrey R. Pisek had seen three such cases within the last seven years, and had a good opportunity to see and study the eye grounds. One patient had a pseudo-paralysis which was very marked. All these cases died before attaining the third year.

He was particularly interested in the presentation of Dr. Kerley's case with the increased pressure of cerebrospinal fluid. Why such an increase in pressure should exist demanded some explanation. In the future he intended to examine the cerebrospinal fluid in these cases to see if he could get closer to the etiology of the condition.

CASE OF SCORBUTUS.

Dr. Godfrey R. Pisek presented a child thirteen months old. This case was not presented because it was an unusual case, but because in the last three cases he had seen each one had been treated for some surgical affection. He did not believe, however, that these mistakes were generally made by internists or pediatrists. The surgeons apparently often looked upon and treated the local condition only; in their hurry or unsystematic examinations, they failed to make a diagnosis.

The baby he presented nursed for six weeks. The breast milk then became insufficient and the child was placed on condensed milk for two weeks. Following that the baby was given Borden's malted milk and had been taking it until it came under observation.

The mother gave the following story: "Six weeks ago in crawling about he sprained his knee and was taken to a dispensary where he was treated locally by a surgeon."

The feeding history in this case was very suggestive. He questioned along the line of scorbutic symptoms; he learned that whenever the child's mouth was cleansed it bled. Blood had appeared in the stools, but this was supposed to have been due to a gastro-enteritis the child had had. The "sprain" of the right knee soon passed to the left knee, and then the baby was brought to the attention of the medical clinic.

The baby was seen for the first time seven days ago. He had a waxy, pale color. The limbs were in a condition of pseudoparalysis. The right knee was somewhat swollen and painful. Even pressure upon the chest or ribs caused pain. An examination of the mouth showed characteristic condition of the gums, swollen and spongy, the hemorrhagic appearance of scorbutus. The swelling of the knee had diminished considerably, even after a few days treatment. The child had no rickety manifestations. Syphilitic paralysis was readily ruled out. The history of the use of a proprietary food over so long a period was suggestive, and the proof was in the result of the antiscorbutic treatment. It was interesting how well such babies could immediately take raw milk without any trouble; they could take care of it without any digestive disturbances whatever.

An examination of the blood in the case presented showed nothing of special interest. The hemoglobin was 30 per cent.; the red cells numbered 2,500,000, and the color index was one-half; there were 7,400 whites. The differential count showed, polymorphonuclears 35 per cent.; small lymphocytes, 20 per cent.; large lymphocytes, 39 per cent.; transitionals, 4 per cent. Eosinophilia was not present. In other words, a well marked secondary anemia.

An *x*-ray picture of the child was passed around, which showed the characteristic changes.

DIABETES IN A CHILD SEVEN YEARS OF AGE.

DR. DAVID BOVAIRD presented a child who had been brought to the Presbyterian Hospital in August. He was seven years old. The family and previous histories were negative. The child had been noticed three weeks prior to admission to pass urine, and urinated frequently. He also had an extreme degree of thirst. They were unable to satisfy his appetite. The physical examination revealed nothing important except what one could see at a glance. The child was under-weight and poorly nourished, and slightly anemic. His organs appeared normal. He was passing between 3,500 and 55500 c.c. of urine daily. The percentage of glucose varied from 1.5 to 2.9. After keeping the child under observation for several days to determine the conditions were under the ordinary diet, he was placed in Dr. Cooke's hands for a study of his metabolism on various carbohydrate diets. It was extremely difficult to handle this patient. When he was placed on a strict diet and the sugar reduced, he made the ward in which he was kept a bedlam. He would invade the kitchen whenever possible and help himself to sugar and anything else obtainable.

DR. ROBERT A. COOKE presented charts which gave a summary of the work done in the case of diabetes presented by Dr. Bovaird, and pointed out the following points of interest: 1. The rapid disappearance of sugar on a carbohydrate-free diet. 2. The very slight increase of acidosis with the sudden change from regular to carbohydrate-free diet. 3. The varying utility of the carbohydrate administered in different forms. 4. The rapid elimination of carbohydrate when administered beyond the limit of tolerance.

DIABETES IN A CHILD SIXTEEN MONTHS OF AGE.

DR. CHARLES GILMORE KERLEY reported this case which was of interest because of the tender age of the child. When fifteen months of age, the child weighed twenty pounds. The patient had suffered from early malnutrition and had been fed on malt soup. The mother noticed when the baby was fifteen months of age that he was very thirsty, and that he wanted to drink more water than he should. After noting this, she brought the child to Dr. Kerley. He secured a specimen of urine and found that it contained 3 per cent. sugar, as well as acetone and diacetic acid. The child died in two months. There was nothing unusual in this case except the tender age of the child, this being the youngest case of the kind that he had ever seen.

PERSISTENT INTUSSUSCEPTION DUE TO AN UNUSUAL CAUSE.

Dr. Charles Gilmore Kerley reported the case of a child seven month old, with abstinate constipation and extreme distention of the abdomen. The constipation was very persistent and required the use of laxatives all the time to move the bowels. Unless the bowels were moved frequently, the distention would be extreme; when the bowels moved freely, the distention would disappear. This was what he termed an intermittent distention of the bowels with constipation. He said he was impressed with the fact that there was present something more than the mere constipation, and a rectal examination was made and an intussusception was found which could be forced up readily with the finger. A tube introduced could be passed into the intussuscepted portion; the opening felt like the opening into an os uteri. Various medical men were consulted and various opinions were expressed. The condition continued, the abdomen became more distended and, on one or two occasions, quite a collapse was caused because of the pressure upon the diaphragm. An exploratory incision was asked for in order to determine just what was wrong, and this was consented to. Dr. Gant saw the case and did the operation seven months ago, entirely relieving the child, the intussusception ceasing to be a factor, with the gut in position, the child thriving, and the stools being what they should be in a child of this age.

DISCUSSION.

Dr. Samuel G. Gant said that it was easy to verify the condition in this child with the proctoscope as described by Dr. Kerley; the invaginated portion of the bowel was eroded or in a chafed condition. After examining the child he felt sure that there was a chronic invagination and some other mechanical obstruction present.

These cases of chronic invagination he believed were more common than generally believed.

Dr. Gant described the operation he performed. A large fibrous ring was encountered which bound the hepatic flexure to the central part of the abdominal wall. This fibrous band was about 1 x 1/4 inches wide. The band was divided and then the hepatic flexure of the colon and the sigmoid was anchored to the inner abdominal parietes to overcome the dropping downward of the gut and prevent a recurrence of the invagination after it had been withdrawn.

Dr. Gant stated that he had performed colopexy eighty-nine times for the relief of enteroptosis and chronic invagination in adults and that the results had been almost universally satisfactory.

EDEMA OF THE LARYNX COMPLICATING NEPHRITIS, WITH SPECIMENS, IN A CHILD FIVE YEARS OF AGE.

Dr. Joseph C. Roper reported the case of a child who was admitted to the New York Hospital with a diagnosis of laryngitis and bronchitis. The child was five years of age. Up to a few days before admission she was apparently well. She remained in the hospital two weeks. She had very little temperature. The dyspnea was very marked and it was thought that she was suffering from a spasmodic laryngitis. The condition gradually subsided under the regulation treatment of irrigations, and some applications to the throat, and steaming. The child returned to the hospital later with dyspnea very marked. One week before this she developed a cold and was treated in the dyspensary. On the day following she was brought to the hospital with very marked expiratory and inspiratory dyspnea. The child was admitted to the ward and seen by Dr. Conners. At 2 o'clock the dyspnea was so great that it was deemed best to intubate the child. This was done and the dyspnea was temporarily relieved. At 10 o'clock marked inspiratory dyspnea appeared and a little morphine was given. The heart weakened and the next morning, without any special cyanosis, the child suddenly died.

At autopsy there was a marked edema of the glottis; the heart showed considerable hypertrophy; the left ventricle was slightly dilated and the right auricle and ventricle were distended with blood. The left kindey was markedly atrophied, being represented by a small mass, about 2.5 x 1 cm. The other kidney was enlarged and showed marked parenchymatous changes. The question naturally arose, was this edema glottidis due to the renal insufficiency? A negative culture for diphtheria organisms was made on the occasion of the first attack. During the fatal attack a negative culture was made during life.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Tonsils as Eliminative Organs.—W. H. Ashhurst (*Amer. Jour. Med. Sci.*, July, 1909) says that the sum and substance of ancient and modern teaching in regard to the function of the tonsils is that they protect the organism from infections by acting as filters and by lessening, in some way, the toxicity of germs which come within their sphere of activity. In connection with a case reported, the writer suggests that the throat symptoms may develop as the result of the elimination of toxins and bacteria, these causing a local manifestation at their point of exit. The case reported was one of staphylococcus tonsillitis following septic infection of the finger with lymphangitis of the forearm, no cultures, however, having been made from the infected finger. This hypothesis is offered as explaining the obscure relation between rheumatism and follicular tonsillitis.

Diagnosis of Syphilis by the Ultramicroscope.—Leon Bizard (*Jour. de Méd. de Paris*, July 3, 1909) says that one of the most important means of diagnosis of syphilis at the present day is furnished by the ultramicroscope. This method of examining the syphilitic fluids and secretions is available by any physician, if supplied with a good microscope and the necessary illuminating apparatus, with an oil-immersion lens and a Leitz condenser. The microorganism of syphilis may be examined alive within a few minutes after withdrawing the fluid, or dead within four or five days after it has been removed. Alive, it is examined in distilled water or in peptonized bouillon. It is much easier to examine the treponema after it is dead. The lesion to be examined must be carefully cleansed with distilled water and cotton, all crusts removed, and curetted lightly with a vaccinostyle, the fluid obtained being mixed with a drop of distilled water on a slide. The preparation is sealed with paraffin. This method is demonstrative for the chancre and moist secondary lesions on the genital organs. In the saliva the spirochete is found in abundance. It is found exceptionally in the erythematous syphilides of the skin, never in tertiary lesions. The examination of the physiological fluids and the blood is negative.

Passage of the Spirochete of Schaudinn into the Cytoplasm of the Unstriped Muscular Fibres in an Heredosyphilitic; its Nonpenetration into the Nerve Cells.—J. Sabrazes and R. Dupérié (*Gaz. Hebd. des Sci. Méd.*, July 27, 1909) describe the examination of the tissues in an infant born at the seventh month of a syphilitic mother, and which lived but twenty-four hours after birth. The infant had a large spleen and hypertrophy of the liver. These organs, the kidneys and suprarenals contained the spirochetes. The spirochetes were numerous in the epithelial cell of the small intestine and in the glandular sacs. The unstriped muscle fibers showed the parasites within the fibers, and were found parallel with the direction of the fibers, and many were close to the nuclear membrane. We see that the spirochete has the power of forcing its entrance into the muscle fibers. The connective tissue fibers also cannot resist them. On the contrary, they were never found in the nerve cells or fibers.

Intussusception.—C. P. B. Clubbe (*Brit. Jour. Child. Dis.*, July, 1909) insists that the treatment of intussusception is laparotomy; but even at the present day men continue to compare the treatment by irrigation with the treatment by laparotomy. Until quite recently he was in the habit of using an injection as a preliminary step in every case of intussusception, the child being under the anesthetic on the table, with everything ready for the operation. In only 16 cases out of 160 was reduction effected by this means. Recently he has altered his method by omitting the injection and proceeding at once to the abdominal section. The mortality is now so low, and manipulation of the intestines carefully carried out is not harmful, that it seems hardly worth while to waste time on a procedure from which so little benefit can be derived. He has had under his care 173 cases of intussusception, 157 laparotomies, 16 reduced by injection. Of those operated upon, first 50, mortality 50 per cent.; second 50, mortality 25 per cent.; third 50, mortality 8 per cent.; last 7, no deaths.

Diagnosis of Permanent Mental Deficiency in Infancy and Childhood.—C. P. Lapage (*Practitioner*, Aug., 1909) states that the diagnosis of the slighter forms of mental deficiency, *i.e.*, of less degree than imbecility or idiocy, is not, as a rule, made during the earlier years of life, unless the child conforms to one or other of the well-recognized types, which is relatively uncommon. Inability to sit up, lateness in learning to walk and to talk may excite the alarm of the parents, but these symptoms are put down to mere backwardness. But the diagnosis is easy in the early months of life in the major forms of mental deficiency, especially if the child conforms to one of the well-recognized types and is a mongol, a cretin, or of the microcephalic or hydrocephalic type. The large square skull of rickets may be mistaken for hydrocephalic enlargement. The first thing to do is to exclude deafness and blindness, and great importance is to be attached to the amount of response to external stimuli and to the general liveliness and expression of the infant, though it is the lateness in the development of the physical powers that excites the alarm of the parents. These symptoms of delayed muscular control are also of great importance as an aid to diagnosis in cases where the mental powers are thought to be lacking. That the infant is late in sitting up, that he shows very little response to external stimuli, that he is below the average in height and weight, with the presence of many of the physical stigmata of degeneration, a family history of feeble-mindedness or of insanity, small circumference of the head, and poor development of control over the sphincters or the general muscular system, are all points suggestive of mental deficiency, and should be carefully noted in each case. Great irritability and a strained look about the eyes may point to mental deficiency, but in these cases it is necessary to exclude all conditions giving rise to pain in the head, such as otitis, intracranial tumor, and meningitis. It must be remembered that late or underdevelopment of function may be due to other conditions, such as wasting, rickets, deafness, and blindness. As the childs gets older the diagnosis becomes increasingly easy, for other tests are applicable, and the difference between the intellect of the child under observation and that of a normal child is much more obvious, receives greater attention, and causes much anxiety. Still, up to the ages of five, six, and seven years there are quite a number of cases in which the diagnosis of real and permanent mental deficiency is not at all easy. The points that help us at this period of childhood are the development of the powers of walking and of talking, the amount of control over the sphincters, and the general mental capacity as judged from the actions, the speech and language, the expression, the powers of memory, attention, imitation, and will, the presence of perverted instincts and habits, such as unusual wantonness and violence, an insatiable appetite, or the eating of clay or dirt. At a still later age we have again better indications of the mental power in the amount of response to skilled tuition, and we can test the mental powers much more readily now that the child has reached an age when those of normal mental capacity can read, write, and do simple sums, for it is in these abstract ideas that the weak mental powers of the slighter cases are made evident.

Pemphigus Neonatorum, or Bullous Impetigo Contagiosa of the New-born.—O. H. Foerster (*Jour. Amer. Med. Assn.*, July 31, 1909) defines pemphigus neonatorum as a contagious disease which affects the new-born at a variable period after birth and is characterized by the rapid development on various parts of the body surface, usually on an erythematous base, of more or less numerous flat vesicles or semiglobular bullæ with clear or purulent contents, which rupture readily, leaving a moist, red, smooth, generally circular defect in the uppermost layers of the epidermis, usually with extensive undermining at the periphery, and which heal without a scar; any constitutional symptoms, if present at all, being a result of the denudation of extensive portions of the body surface or due to supervening infection, rather than an integral part of the disease. It often appears in epidemic form, especially in foundling asylums, obstetric wards, or in the practice of midwives, and isolated instances of its appearance are frequent. The recognition of a benign and a malignant form is based on the observation that in some instances but few lesions develop and a correspondingly small extent of the cutaneous surface is involved, constitutional symptoms are entirely absent, and rapid healing occurs; while in other cases the disease develops with extraordinary rapidity and affects almost the entire cutaneous surface, the infant succumbing often within a day or two after the first manifestations of the disease. It is a remarkable fact that in these rapidly fatal cases there is often but little evidence of constitutional disturbance. Evidences of constitutional involvement are occasionally found, however, in a rise of temperature, diarrhea, or symptoms of general exhaustion. In those of the writer's cases in which material for bacteriologic examination was obtainable, the *Staphylococcus pyogenes aureus* was found in pure culture. It appears impossible to bring any one organism into causal relation with the disease.

A similar condition of uncertainty exists in connection with the bacteriology of impetigo contagiosa, which may be produced by either the common staphylococci or streptococci—most often by the former. There appears to be enough other evidence at hand to warrant classing pemphigus neonatorum and impetigo contagiosa as identical diseases. To the anatomic and physiologic differences between the skin of the new-born and that of older children and of adults can be ascribed the variation in clinical appearance. Pemphigus neonatorum can only be regarded as a bullous, infantile variant of impetigo contagiosa, and not as an independent disease. The treatment of greatest efficiency is, with some modification, the same as that which may be regarded as specific in the impetigo contagiosa of adults. The vesicles or bullæ are drained, the edges of the lesions are thoroughly exposed, and the entire base is freely anointed with 2 per cent. ammoniated mercury ointment. The lesions are dressed with gauze and cotton, and individually thus isolated. Mercurial intoxication has not occurred, even when extensively denuded areas were treated in this manner. To secure asepsis of the uninvolved surface the infant is bathed in a warm permanganate solution and sponged with the solution whenever the dressings are changed.

Mitral Stenosis in Childhood.—F. J. Poynton (*Clin. Jour.*, July 21, 1909) says that the treatment of mitral stenosis in childhood is mainly the treatment of rheumatism. The parents should be warned of the meaning of sore throats, fleeting pains, nervousness and chorea, feverishness and pallor. If possible such children should be taken from damp, low-lying houses, and properly clothed and their extremities protected. Large unhealthy tonsils should be enucleated. Spring and autumn, and particularly sudden damp cold after much heat, should be a signal for added watchfulness. Early symptoms should be promptly treated by rest and warmth and the use of salicylate of soda.

Treatment of Cerebrospinal Meningitis with Flexner's Serum.—N. P. Marsh and O. T. Williams (*Brit. Jour. Child. Dis.*, July, 1909) report their results with fourteen cases which varied in age from three months to four years. Twelve of these fourteen were under one year, and therefore in that period which Flexner's statistics show to be the most fatal, but in spite of this, of the fourteen cases there were seven recoveries, five of which were in children under one year. Only three cases were obtained in the first few days of illness, all of which recovered, of which two were infants of only three and five months' respectively. In the other cases the serum was injected from the seventh to as late as the fifty-eighth day, and therefore in some of them it is possible they might have recovered without this treatment, but even in these the serum had a very definite influence upon the causative organism and upon the cytology of the fluid. The total amount of serum used in each case varied from 10 c.c. to 130 c.c., and the number of injections from one to five.

Infantile Paralysis.—H. C. Emerson (*Bost. Med. Surg. Jour.*, July 22, 1909) analyzes and discusses an epidemic of sixty-nine cases of this affection occurring in western Massachusetts in 1908. These were groups of cases of an acute disease attacking children chiefly, but youth and adults frequently up to the age of twenty-five years, among the inhabitants of river valleys in sparsely-settled communities, occurring during the summer months of a hot, dry season. The persons attacked lived chiefly in detached houses and but eight lived in houses or blocks of more than three tenements. Ninety per cent. of the persons attacked were in good health, and while a few instances of traumatism, overheating, fatigue, and swimming were noted previous to the onset, these were not different from what might be found in the history of almost any groups of persons at this season. The investigation of this group of cases suggests that the disease is but mildly contagious to say the most. A large number of children were in intimate contact with those that were sick, and of these children an insignificant minority developed the disease. The sanitary conditions under which most of the cases lived were not good. Dampness prevailed in many locations and most of the houses were very near water. The outbreak was in the valleys. Most of the houses had no sewer connection. The marked digestive disturbances, which were early and notable symptoms, suggest the stomach as the port of entry for the infection. It does not seem possible in this outbreak to blame the varied sources of milk or water supply as a carrier of the infection, unless it be considered that the cause of the disease may be present in all milk or in all water. That the cause may be connected with the food seems possible. None of the seven infants under one year of age were fed exclusively upon breast milk. All the cases living on the hill farms had been in the valley towns recently where infection may have occurred and many families purchased some of their food supplies from peddlers' carts which act as the go-between between the town and the country. It is not known what influences the dry season with its low water and the proximity of many of the houses to water contribute, but these facts appear to be significant.

Relation of Measles, Whooping-cough, and Influenza to Tuberculosis in Children.—Tuberculosis has been observed to follow these infectious diseases, as a complication or sequela, in a large proportion of cases. In considering the relation existing between them. E. P. Copeland (*Arch. Ped.*, July, 1909) calls special attention to the fact that these infectious diseases are all characterized by marked catarrhal inflammation of the mucous membranes, and to this he attributes whatever connection exists between them and tuberculosis. He thinks that taking into consideration the enormous morbidity of measles, whooping-cough, and influenza, the incidence of tuberculosis as a complication or sequela is of relatively small importance; that its development is all but invariably dependent upon the pre-existence of a latent focus of infection; and that its dissemination is directly due to the lymphatic activity accompanying the pulmonary inflammation so constantly associated with these diseases.

Tuberculous Pulmonary Cavities in Infants.—In order to study the frequency of tuberculous cavities in infants, C. Y. White and H. C. Carpenter (*Amer. Jour. Med. Sci.*, July, 1909) have examined the records of the Children's Hospital of Philadelphia for about the past seventeen years. Of 4,518 infants admitted during this period, 1,140 have died. The number of autopsies performed was 371, of which 75 disclosed tuberculosis. Of the total number of deaths, 6.5 per cent. were tuberculous. Comparing the number of tuberculous autopsies with the total number of admissions during this period, it is found that 1.6 per cent. were tuberculous. Regarding the frequency of cavity formation in the lungs of infants dead of tuberculosis, the records of the Children's Hospital show that cavity formations were present in twelve of the seventy-five subjects dead of tuberculosis (16 per cent.). Cavity formation does not occur with the same frequency in infants as in older children. In the writers' six autopsies 16 per cent. of the infants dead from tuberculosis showed cavity formation: a far lower percentage than is reported by other observers. The type of lesion observed is not of the variety which lasts long enough to produce cavity formation. The infants usually succumb to the widespread process before the larger lesions have time to soften and their contents to be thrown off. In the authors' cases tuberculous cavities in infants occurred most often at the root of the lungs, in the middle and lower lobes.

Malignant Newgrowth in Childhood.—W. A. Edwards (*Amer. Jour. Med. Science*, July, 1909) states that malignant ovarian tumors are more common in children than in very old women; of these, the ovarian dermoids and sarcomas are perhaps the most frequent. In the child, unlike the adult, abnormal pelvic conditions are always of a serious nature. An abdominal tumor in a child is likely to be either a dermoid cyst, sarcoma, or adenocarcinoma of the ovaries, malignant or cystic renal diseases, or certain somewhat rare and atypical retroperitoneal renal disorders. Dermoid cysts grow slowly and lack early symptoms, so are likely to be carried to puberty or even adult life. Ovarian cysts, on the other hand, are brought to us while the child is still quite young; it may be as young as three months. Malignant disease of the organs develops very rapidly in the child, and is likely to be accompanied by ascitic fluid; but the general health does not become involved as early as we would suppose. Sarcoma is the most frequent growth found in the child's ovary. Primary vaginal tumors are rare at all ages; they are usually fibroma, fibromyoma, myoma, sarcoma, or carcinoma. All except the last two are very rare in children, and these even are of very infrequent occurrence. Sarcoma of the vagina, however, is more frequent in children than in adults. The treatment of malignant vaginal growth is radically surgical. Simple excision of the vaginal polyp, the usual early form of vaginal sarcoma in children, or of the more diffuse tumor growth, will inevitably be followed by recurrence sooner or later, usually soon. After thorough and complete removal a number of children have remained free from the growth for many years. All the cases of carcinoma are fatal.

Congenital, Hereditary, and Family Hematuria.—John Aitken (*Lancet*, Aug. 14, 1909) presents an interesting report of seven cases of hematuria in one family, which he has had under observation for seven years. The family consists of seventeen persons in four generations, and ten of these have suffered from hematuria. The hematuria has been inherited, first, through the female side, and then on two occasions through the male side, in one case the transmitting male not being affected. In all the six children the condition has probably been congenital. Two of them were noticed to pass blood-colored urine during the first week of life; in three, blood was first observed at from twelve to eighteen months, when the napkins were dispensed with: and in the sixth (aged eleven months), though to the eye the urine had a normal appearance, albumin was present and blood-corpuscles microscopically in the first specimen obtained (at four months). The children are, with one exception, subject to periodic febrile attacks occurring at irregular intervals during which the quantity of blood passed is much increased. These attacks sometimes occur without very evident cause. Any trifling cold, nasal or bronchial, is invariably followed by an attack, but diet has no such constant effect, though in three of the children the eating of vegetables or apples has very regularly produced it. The exacerbation sets in suddenly, the child is feverish for a day or two and usually confined to bed, there is frequency of micturition, and sometimes enuresis, but never any complaint of pain. The child is well again by the third day as a rule, though occasionally the indisposition lasts from one to two weeks. During the attack the quantity of blood passed increases for a few days and then gradually lessens, and the urine regains its normal appearance by the end of the second or third week. Any general disturbance of the health at this time has invariably had the effect of prolonging the attack and increasing the quantity of blood but exercise has no effect in this way, and the attacks are not more frequent or prolonged at one season than another. The quantity of urine passed daily in an attack is normal; the specific gravity is from 1015 to 1030, and the reaction neutral or acid. Albumin varies from 0.05 to 0.5 Esbach and is in accordance with the blood present. The deposit, which is slight, contains many red blood-corpuscles, abundant blood casts, an occasional hyaline cast, but not others; usually a few crystals of uric acid or of oxalates, and granular matter. There has never been edema or dropsy at any time in any of the cases, nor pain on micturition, nor renal tenderness. The heart and vessels appear normal in all. None of them have suffered from scarlet fever, or rheumatism, or from graval; and they have never shown any symptoms of scurvy, purpura, or Raynaud's disease. There is no history of other hemorrhage in any of the cases. The other ordinary causes of hematuria (calculus, tubercle, syphilis, neoplasm, etc.) can be excluded.

Middle-milk Mixtures.—A. F. Hess (*Jour. Amer. Med. Assn.*, Aug. 14, 1909) says that it has been shown that when milk is allowed to stand the bacteria are carried upward with the fat globules so that the cream layer contains a far greater number of microorganisms than the underlying skim milk. Partially skimmed or "middle milk" has been used by the writer in middle-milk mixtures, mainly in the dispensary, prescribing them to women who are certainly not endowed with more than average intelligence. These mothers were given the following directions: Remove the upper two ounces of cream and keep it for table use. Then dip off the next eight ounces of milk. (This furnishes them with a standard 10 per cent. cream.) They are then directed to dilute a certain number of ounces of this cream with water or barley water according to the age or condition of the infant. If a 12 per cent. cream is preferred as a basis, seven instead of eight ounces of middle milk is ordered removed; if a 7 per cent. cream is desired, twelve ounces are removed. He does not urge this modification as a method of purifying dirty milk, as a substitute for pasteurization or sterilization, but merely calls the attention of those who prescribe cream dilutions to the fact that "middle milk," that is bottled milk deprived of its upper two ounces, not only contains fewer bacteria than top milk, but has been found of practical value in the feeding of infants.

Treatment of Infantile Diarrheas due to Fermentation.—The causes of diarrheal diseases are classified by C. H. Dunn (*Jour. Amer. Med. Assn.*, Aug. 21, 1909) as follows: first, nervous influences; second, indigestion; third, bacterial fermentation, and, fourth, bacterial infection, respectively. The term infectious diarrhea may be selected to include all cases in which there is true infection with parasites, while the term fermental diarrhea, or acute intestinal indigestion of the fermentation type, may be selected to include all cases in which the fundamental etiologic factor is saprophytic fermentation. This distinction between parasitic and saprophytic action of bacteria has the further advantage of being in line with modern effort in specific therapy. Applying the principle of the antagonism existing between varieties of bacteria, Dunn has employed buttermilk for giving lactic acid bacilli. The routine treatment began with castor oil or calomel, boiled water for twenty-four hours, barley water for another day, and then weak and gradually increasing milk mixtures. If, however, the resumption of milk-feeding was followed by a return of the symptoms, and further loss of weight, the same process was repeated, milk being this time withheld longer, at least seventy-two hours. Bismuth and irrigation of the colon were also tried, and milk-feeding was finally resumed in the form of whey, to be gradually strengthened. If after this treatment the symptoms did not improve after a reasonable time, the strength of the milk was increased. If this failed, the case came into the category of obstinate and resistant cases, and was usually treated by alternating in turn the percentages of the various elements, by cereal diluents, by peptonizing or by resorting to a wet-nurse. Selecting such resistant cases for the experiment with living lactic acid bacilli, the writer obtained the following results with 100 frankly fermental cases: Treatment—successful, seventy-four cases; partly successful, twelve cases; failed, fourteen cases. Under this treatment, when successful, the character of the dejecta changes from loose, foul and green, to formed, pale yellow, with a sour odor. The typical lactic acid stool is of rather firm consistency, is light yellow, or white and putty-like, and has a rather agreeable sour odor. With the cessation of the diarrhea, the toxic symptoms disappear, vomiting ceases, and the child becomes happy and comfortable. At times the sour milk is vomited at first, but this rarely lasts more than one or two days. In the most successful cases, gain in weight is rapid. It is necessary to employ fat-free milk, for unless it is skimmed the fat rises to the top of the ripened milk as liquid butter—not a suitable food for these cases. To prepare ripened milk an efficient strain of the lactic acid bacillus should be obtained in bouillon culture. The cream is removed as far as possible from the milk, and then the skimmed milk is inoculated with the lactic acid culture. The inoculated milk is then kept in a warm place until enough acidity develops to sour the milk or to produce a very fine curd, when the milk is set aside and kept on ice for use. Some of this milk is set aside each day, to be used as a culture for inoculating the next day's supply. The artificial tablets of the lactic acid bacillus, such as the lactone tablets and similar products, make excellent buttermilk for mere feeding purposes, but are not advisable when the purpose is to give as many as possible of the living bacilli.

So-called Summer Diarrhea in Infants.—C. L. Grulee (*Jour. Amer. Med. Assn.*, Aug. 14, 1909) believes that, though infection of the intestinal wall probably takes place in some cases, it is not the usual cause of a summer diarrhea in infants, but that this affection is, as a rule, due to a disturbance of metabolism or decomposition of the food. As to treatment he advises starvation for one to two days followed by use of diluted skimmed milk gradually increased to whole milk. Lavage may be necessitated by vomiting. Colonic flushings are used to reduce temperature, and the rectal tube and turpentine stupes for distention. Calomel and intestinal antiseptics he would avoid if possible.

Hair Ball of the Stomach in Children.—W. W. Butterworth (*Jour. Amer. Med. Assn.*, Aug. 21, 1909) reports a fatal case of hair cast of the stomach four inches wide at the esophageal end and about two inches thick, in a girl of eight years. It was complicated by a perforated chronic ulcer which formed an abscess cavity and was firmly adherent to the liver. The paper contains abstracts of forty-two reported cases.

Use of the Vacuum Bottle; Constipation in Infants.—In a discussive paper on the new-born, H. E. Tuley (*Arch. Ped.*, Aug. 1909) utters a very practical word of warning against the use of the vacuum bottle for keeping the infant's milk warm. Although this may be the boon to the overworked parents which its manufacturers claim it to be, it is a serious menace to the child. The writer put an infant on modified milk twice a day, and loose green stools soon resulted. It was found that the morning feeding was warmed in the evening and kept in a vacuum bottle until used. A count of the bacteria in this milk made in the morning showed 1,400,000 bacteria, while the certified milk from which it had been prepared and which had been simply kept carefully covered, showed, at the same hour, only 3,500. Without change of formula or any medication, recovery rapidly followed the discontinuance of the use of the labor-saving bottle.

The same writer states that constipation is the normal condition of the infant, from the third or fourth month. This is due to the conformation of the sigmoid and colon. The sigmoid in the infant is longer in proportion to the length of the colon than any other portion of it, and the mesosigmoid is longer than it is in later life, giving the sigmoid a wider range of motion. Hence this portion of the bowel is often found beyond the median line of the abdomen, on the right side, and as it is the reservoir for the fecal accumulation of the intestines until the bowel contents reach the rectum there is no passage of fecal matter. No change of diet will accomplish regular daily evacuations, and they must be had by the administration of daily enemata, or alternate use of the enemas or glycerin or soap suppositories. As the child grows, the descending and transverse colon lengthen at the expense of tee sigmoid. The sigmoid becomes much straighter than before, and unassisted movements from the bowel are more frequent.

Exstrophy of the Bladder.—In recording a successful Bergenhem's operation, extraperitoneal implantation into the rectum of the ureters with a small portion of the vesical mucosa surrounding their openings, J. J. Buchanan (*Penn. Med. Jour.*, Sept., 1909) states that he could find reports of only 127 cases of intestinal implantation of intact ureters with part of the bladder wall attached. Of these, eighty were pure Maydl operations with a mortality of 27.5 per cent., and twenty-seven were pure Bergenhem operations with a mortality of only 11 per cent. In attempting to follow the ninety-six who survived operation, he found sixty-five well at last report and only eight are known to have developed ascending urinary infection.

The Problem of the Individual Flora of Bacterium Coli, Administration by Mouth of Heterogeneous Bacteria.—Ludwig Jehle and Maurizio Bincherele (*Rivista di Clin. Ped.*, August, 1909) say that there is no doubt that each intestine has an individual flora, peculiar to the person bearing it. They give the method by which this may be demonstrated, and the conclusions arrived at by means of their experiments. They succeeded in demonstrating in a baby for a long time, by means of a monovalent immune serum, an individual flora. A homologous flora was observed continuously and constant, which was definitely lost by means of an incongruous feeding. The unity of germs demonstrable by agglutination extended in the same individual to varieties of germs morphologically different. By administration by mouth it is possible to obtain heterologous germs in the feces very soon. At the same time the individual flora disappears rapidly from the intestine. After a short time the heterologous germs disappear again. The defense of the system shown by the rapid elimination of the heterogeneous bacteria is a congenital or acquired property of the organism which is present only with the bacteria coli. A curative influence on the intestinal functions by the administration of heterogeneous bacteria is not possible.

Treatment of Epidemic Cerebrospinal Meningitis.—Roger Voisin (*Gaz. des Hôp.*, August 21, 1909) says that the treatment of cerebrospinal meningitis includes hot baths, repeated lumbar punctures, and colloidal silver injections; but by far the most important measure is the injection of anti-meningococcic serum. This must be introduced by spinal puncture if we expect to get good results, and must be begun as soon as the diagnosis is made, the earlier the better. The amount to be injected varies with the age of the patient between ten and fifteen cublic centimeters at each injection for children. Thirty to forty cubic centimeters is the dose in the adult. The number of injections varies with the preference of the physician, three being generally given on three consecutive days. After this series it is not necessary to repeat them if the patient's condition improves. In very grave cases two injections may be given in each day. The condition of the patient must be judged not by the temperature, but by the general symptoms. Eruptions and elevations of temperature, rheumatic pains and secondary infections of the meninges are possible accidents. The results are immediate; the headache lessens, the mind clears, stiffness of the neck and limbs disappears, sleep becomes possible, and the patient becomes another creature. The cerebrospinal fluid becomes clear. Mortality is diminished, relapses are less frequent, the duration of the disease is less, and serious sequelæ are infrequent. Prophylaxis would necessitate the isolation and disinfection of the nose and throat of all persons who have been in contact with the patient; but this is not generally possible. Gargles and inhalations of antiseptics have some value, while the disinfection of rooms and furniture is of less importance.

Five Hundred Negative Ophthalmo-Reactions in the New-born.—Duverger (*Ann. de Gyn. et d'Obst.*, August, 1909) has made at the Hospital Baudelocque installations of tuberculin into the eyes of 500 new-born infants. An aqueous solution of tuberculin furnished by the Pasteur Institute was used. Of the 524 reactions tried by the author none were positive or showed tuberculosis. The author concludes that the ophthalmo-reaction is always negative in the new-born. This is a proof in favor of the non-heredity of tuberculosis. The absence of this reaction in so large a number of nontuberculous persons shows that it is never positive when the organism has not been tuberculized.

Oxygen in Serious Cases of Whooping-cough.—E. Weill and G. Mouriquand (*Lyon Médicale*, Aug. 22, 1909) tell of the beneficial effects of inhalation of oxygen in severe cases of whooping-cough. It acts as a most efficient sedative of the cough, lessening the severity of the paroxysms, although it does not diminish their frequency. It is also a valuable prophylactic measure against pneumonia as a complication of this disease. When pneumonia has attacked the infant it acts as an antiseptic and prevents the spread of the process to new localities. The authors have made use of this medication in about thirty cases with great benefit. Cyanosis is lessened, somnolence between the attacks is prevented, and appetite is improved.

Treatment of Diphtheria with Special Reference to Prevention of Heart Failure.—The essentials of treatment for the heart condition accompanying diphtheria are, according to Langley Porter (*Arch. Ped.*, Aug., 1909), prompt and sufficient dosage of antitoxin; rest in bed not less than three weeks; attention to the condition of the abdominal viscera; a nutritious, easily digestible diet; certain drugs each according to the indications: for a slow heart, atropin; for a racing heart, camphor, and ice to the precordium; for vascular failure, ergot. If the heart failure is incidental to an overwhelming toxemia with lethargy, hypodermoclysis is advisable. The factors determining the number of units of antitoxin to be given are: the intensity of the toxemia, the extent of the involvement, the time elapsed since the first manifestation of the disease, and the presence or absence of stenosis of the air passages.

Suppurative Conditions in the Joint Regions in Infants and Young Children.—L. E. La Fétra (*Jour. Amer. Med. Assn.*, Aug. 21, 1909) calls attention to the difficulties of diagnosis of such conditions and cites examples of the following groups of cases: arthritis due to the streptococcus, or to the staphylococcus or to mixed infection by these germs; arthritis due to the gonococcus; arthritis due to the pneumococcus; arthritis due to the bacillus of influenza; cases of osteomyelitis, including periostitis and epiphysitis; cases of deep cellulitis; cases of perinephritic abscess, psoas abscess and ischiorectal abscess. In all cases a careful history of the infant from birth should be obtained. The inquiry should be directed particularly toward obtaining a history of umbilical infection, of early ophthalmia, of vaginitis, of pneumonia, typhoid and influenza. The feeding history, especially the use of sterilized, carbohydrate, or proprietary foods, should be carefully scrutinized. An inspection of the gums may save an incision into the thigh. The patient should be undressed entirely for examination. Men frequently fail in diagnosis, not because they do not know, but because they do not see the patient and do not make use of what they know. The diagnosis of tuberculosis and rheumatism should be made by exclusion.

Enlargement of Nasal Sinuses in Young Children by Orthodontia.—E. A. Bogue (*Jour. Amer. Med. Assn.*, Aug. 7, 1909) has, in perhaps twenty or thirty cases, succeeded in relieving nasal stenosis by gradual expansion of the arches of temporary teeth, promoting thereby nasal breathing, which function, when it is performed, tends to produce a normally widened nasal passage. In cases in which a rapid spreading of the upper maxilla is applicable—that is, in which permanent teeth are sufficiently developed and erupted for the operator to be able to attach his apparatus firmly and to apply the necessary force promptly—that method is distinctly preferable for the correction of nasal stenosis. When, however, the difficulty is recognized early enough to have it corrected by means of apparatus attached to the temporary teeth, the latter method, being to a great extent preventive, becomes distinctly preferable.

Adenoid Hypertrophy During the First Year of Life.—R. G. Freeman (*Jour. Amer. Med. Assn.*, Aug. 21, 1909) briefly describes the symptoms and the technic of examination and operation for adenoids. He believes that adenoid hypertrophy which causes persistent symptoms should be operated on as early as the fourth or fifth month of life, and that the operation should be done rapidly and without an anesthetic unless the latter is demanded by the parents. Recurrence of adenoids is due largely to the predisposition on the part of the child to produce adenoid tissue and not to defective operation, and it might well be questioned whether, if it were possible, it would be good policy to remove all adenoid tissue. It is, however, necessary to eliminat obstruction and irritation due to large adenoids.

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